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Highlights

A Three Gaps Model

Mathematical Research in Digital

Discovering Thoughts, Inventing Future

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Mathematical Research in Digital Age

By Olanrewaju M. Oyenike , Obanla M. Elizabeth, Akatakpo E. Jeremiah
& Adebiyi Faith O.

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Abstract- The time when someone can do real, publishable mathematics completely without the aid of a computer is coming to a close; the use of computers in mathematical research is both widespread and under-acknowledged. Mathematicians use computers in a number of ways. This paper highlights the importance of mathematics and digital age in today's technological advancement; it also explains the influence of digital age on Mathematics research. Key areas where Information and Communication Technology can be applied to Mathematical research are discussed. To demonstrate the use of computer program on Mathematical analysis, some problems were solved analytically and were also solved using computer programs (Mathlab and Python). These two procedures are compared and it is clearly shown that using computer packages to solve Mathematical problems are more efficient, easier and accurate.

Keywords : *mathematical research, digital age, automated theorem proven, scientific computing.*

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Mathematical Research in Digital Age

Olanrewaju M. Oyenike ^α, Obanla M. Elizabeth ^σ, Akatakpo E. Jeremiah ^ρ & Adebisi Faith O. ^ω

Abstract- The time when someone can do real, publishable mathematics completely without the aid of a computer is coming to a close; the use of computers in mathematical research is both widespread and under-acknowledged. Mathematicians use computers in a number of ways. This paper highlights the importance of mathematics and digital age in today's technological advancement; it also explains the influence of digital age on Mathematics research. Key areas where Information and Communication Technology can be applied to Mathematical research are discussed. To demonstrate the use of computer program on Mathematical analysis, some problems were solved analytically and were also solved using computer programs (Mathlab and Python). These two procedures are compared and it is clearly shown that using computer packages to solve Mathematical problems are more efficient, easier and accurate.

Keywords: *mathematical research, digital age, automated theorem proven, scientific computing.*

I. INTRODUCTION

Mathematics is often defined as the study of quantity, magnitude, and relations of numbers or symbols. It embraces the subjects of arithmetic, geometry, algebra, calculus, probability, statistics, and many other special areas of research. It is the study of structures and pattern in large numerical sets [1]. Mathematics is an indispensable subject of study; it plays an important role in forming the basis of all other sciences which deal with the material substance of space and time. It is said that Mathematics is the gate and key of the Science.

According to [2] Mathematics is a way of thinking, a way of organizing a logical proof, a way reasoning that gives an insight into the power of human mind. It is uniquely well placed to respond to the demand of rapidly changing fields of life such as engineering, biological sciences, medicine and economic.

Research in general is a way of investigating a system, model, matter or theorem to discover hidden or previously unknown fact.

a) Research in Mathematics

In mathematics, research calls for the creation of new results, that is, either new theorems radically different or improved proofs of older results. Research comprises of creative work undertaken on a systematic

basis in order to increase the stock of knowledge, including knowledge of humans, culture and society, and the use of this stock of knowledge to devise new applications. It is used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories [3]. A research project may also be an expansion on past work in the field. To test the validity of instruments, procedures, or experiments, research may replicate elements of prior projects, or the project as a whole. According to [4] research is the systematic investigative process employed to increase or revise current knowledge by discovering new facts. In Mathematics research theorem can be proved as well as taking a number of pieces and constructing a worthwhile example by putting them together in a new way [3].

b) Digital age

The digital age also known as computer age, information age, new media age; is a period in human history characterized by the shift from traditional industry that the industrial revolution brought through industrialization, to an economy based on information computerization. The digital age is the time period starting in the 1970s with the introduction of the personal computer with subsequent technology introduced providing the ability to make work easier and faster. The digital age formed by capitalizing on computer microminiaturization advances the evolution of technology in daily life, as well as educational life style. Digital age has allowed rapid global communications and networking to shape modern society which we call Information and Communication Technology (ICT) world [5].

ICT is an umbrella term that includes any communication device or application, encompassing: radio, telephone lines and wireless signals, computers as well as necessary enterprise software, hardware, storage, and audio-visual systems, satellite systems which enable users to access, store, transmit, and manipulate information. It is also encompasses various services and applications associated with them, such as videoconferencing and distance learning. It stresses the role of unified communication and the integration of telecommunications [5].

c) Benefits of Digital age to Research

The digital age (Information Age) has affected the workforce in several ways.

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- Internet as a global platform accelerates the flow of information and gives researchers access to a wealth of facts, ideals and academic assistance to other researchers. It gives access to a worldwide library of journals and articles for research literature guide.
- Information storage: With the help of digital age, researchers no longer have to pile up so many research works in form of paper, which are (papers) likely to get damaged by rodents, water etc. However, with help of digital age, so many research works can be stored in a flash [5].
- Computation: The world's technological capacity to compute information with humanly guided general-purpose computers grew from 3.0×10^8 MIPS in 1986, to 4.4×10^9 MIPS in 1993, 2.9×10^{11} MIPS in 2000 to 6.4×10^{12} MIPS in 2007 [6]. Computation is fundamental to scientific research.
- Electronic publication is gradually transforming the way we write papers. At first sight, word processing looks like just a convenient way of writing; but slowly many features of electronic versions become available that are superior to the usual printed papers.
- Presentation of research results in digital age using applications like Power Point, spreadsheets, helps the audience to understand easily.

II. KEY ROLES DIGITAL AGE HAS PLAYED IN MATHEMATICAL RESEARCH

Before the digital age, professional mathematicians did most of their work on desks using paper and pencil. Today mathematicians still sit at a desk facing monitor screens or laptops. The paper and pencil are still there but a lot of mathematician's activities now involve the use of computer. The computer does not simply assist mathematicians in doing business as usual; rather it changes the nature of what is done. Computers then have changed the way Mathematics progresses. There are many specific forms in which digital age has contributed to mathematical research, some of these forms are in problem solving task, exploring pattern and relationships, practicing of number skills, calculators, spreadsheets, databases and online, interactive resources, automated theorem proving, symbolic computation, scientific computing.

a) Problem solving task

Problem solving task in mathematics is about solving mathematical problems. The major aim of mathematics education is to equip researchers to solve problems. Mathematics consists of skills and processes. The skills are things that researchers are familiar with. These include the basic arithmetical processes and the algorithms that go with them. They also include algebra in all its levels as well as

sophisticated areas such as the calculus. Problem solving task is a mathematical process. It is the side of mathematics that enables us to use acquired skills in a wide variety of situations.

Now we shall consider some problems, by solving them manually and also using a computer program.

Example 1:

Given an initial value problem

$$y'' = -y \quad \text{with} \quad y(0) = 1, y'(0) = 1 \quad (1)$$

Note [equation 1 is a linear second - order homogeneous differential equation]

Manual Solution

To solve this let assume that $y = e^{mx}$ is a solution to equation 1

Hence; finding the derivative we have,

$$y' = me^{mx}$$

Differentiating further we have,

$$y'' = m^2 e^{mx}$$

Putting these result back into equation 1,

$$\begin{aligned} m^2 e^{mx} &= -e^{mx} \\ &= 0 \end{aligned}$$

Factorizing,
 $e^{mx}(m^2 + 1) = 0$

Divide both side by e^{mx} we have,

$$m^2 + 1 = 0 \quad (\text{characteristic equation})$$

$$m^2 = -1$$

$$m = \sqrt{-1}$$

$$m = \pm i.$$

Since the root of the characteristic equation is complex, hence the general solution of equation 1 is:

$$y(x) = [A \cos x + B \sin x] \quad (2)$$

Now applying the initial conditions

$$\begin{aligned} y(0) &= A \cos 0 + B \sin 0 \\ &= 1 \end{aligned}$$

Note: $\sin 0 = 0, \cos 0 = 1$

Hence, $A = 1$

Differentiating equation 2

$$y'(x) = -A \sin x + B \cos x$$

Applying the conditions

$$y'(0) = -A \sin 0 + B \cos 0 = 1$$

Hence,

$$B=1$$

Putting the value of A and B in equation 2, hence the general solution is,

$$y(x) = \cos x + \sin x$$

Using a Computer Package (Mathlab) to Solve Equation1

The command is below;

```
>> G = dsolve('D2y+y=0','y(0)=1','Dy(0)=1')
```

G = cos(x) + sin(x)

Hence, we can conclude that using Matlab (an I.C.T tool) has made the whole work easier and faster.

Example 2 :

Here is another example using analytical skills and Matlab to a matrix problem.

Manual Solution

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 6 & 4 & 2 \\ 5 & 8 & 3 \end{bmatrix}$$

To find the determinant of matrix A

$$\text{Det}(A) = 1(4 \times 3 - 8 \times 2) - 2(6 \times 3 - 5 \times 2) + 3(6 \times 8 - 5 \times 4)$$

$$\text{Det}(A) = 1(12 - 16) - 2(18 - 10) + 3(48 - 20)$$

$$\text{Det}(A) = -4 - 16 + 84$$

$$\text{Det}(A) = 64$$

Using A Computer Package (Mathlab) To Solve The Matrix

The command is below;

```
>> A = [1 2 3; 6 4 2; 5 8 3];
```

```
>> N = det(A)
```

$$N = 64$$

Example 3

Giving an initial value problem

$$y'' = -y \quad \text{with } y(0) = 1, y'(0) = 1$$

Solving using the Numerical Scheme below;

Derivation Of The Scheme

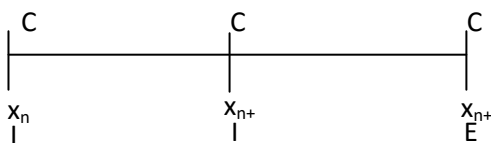


Figure 1 : diagram illustrating collocation and interpolation points

Where; I = Interpolation point, C = Collocation point and E = Evaluation point
Given

$$y''(x) = f(x, y), y(x_0) = \alpha, y(x_1) = \beta \quad (1)$$

Let the basis solution to the special second order initial value problems (1) be the exponential function

$$y(x) = e^{\alpha x} = \sum_{j=0}^{\infty} \frac{\alpha_j x^j}{j!}, \quad (2)$$

where α is a constant.

Expanding equation (2) gives

$$\sum_{j=0}^{r-1} \frac{\alpha_j x^j}{j!} = \alpha_0 x^0 + \alpha_1 x^1 + \frac{1}{2!} \alpha_2 x^2 + \frac{1}{3!} \alpha_3 x^3 + \dots \quad (3)$$

Taking r in equation (3) to be the sum of number of interpolation points (I) and number of collocation points (C), I = 2 and C = 3, the approximate solution to equation (1) is;

$$y(x) = \sum_{j=0}^4 \frac{\alpha_j x^j}{j!} = \alpha_0 x^0 + \alpha_1 x^1 + \frac{1}{2!} \alpha_2 x^2 + \frac{1}{3!} \alpha_3 x^3 + \frac{1}{4!} \alpha_4 x^4 \quad (4)$$

Differentiating equation (4) twice gives;

$$y'(x) = \alpha_1 + \alpha_2 x + \frac{1}{2} \alpha_3 x^2 + \frac{1}{6} \alpha_4 x^3 + \dots \quad (5)$$

and

$$y''(x) = \alpha_2 + \alpha_3 x + \frac{1}{2} \alpha_4 x^2 + \dots \quad (6)$$

Interpolating equation (4) at x_n and x_{n+1}

$$y_n = \alpha_0 + \alpha_1 x_n + \frac{1}{2} \alpha_2 x_n^2 + \frac{1}{6} \alpha_3 x_n^3 + \frac{1}{24} \alpha_4 x_n^4 \quad (7)$$

$$y_{n+1} = \alpha_0 + \alpha_1 x_{n+1} + \frac{1}{2} \alpha_2 x_{n+1}^2 + \frac{1}{6} \alpha_3 x_{n+1}^3 + \frac{1}{24} \alpha_4 x_{n+1}^4 \quad (8)$$

Collocating equation (6) at x_n, x_{n+1}, x_{n+2} .

$$f_n = \alpha_2 + \alpha_3 x_n + \frac{1}{2} \alpha_4 x_n^2 \quad (9)$$

$$f_{n+1} = \alpha_2 + \alpha_3 x_{n+1} + \frac{1}{2} \alpha_4 x_{n+1}^2 \quad (10)$$

$$f_{n+2} = \alpha_2 + \alpha_3 x_{n+2} + \frac{1}{2} \alpha_4 x_{n+2}^2 \quad (11)$$

Where; $x_{n+1} = x_n + h$ and $x_{n+2} = x_n + 2h$

From the result gotten,

Now we obtain the coefficients $\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4$ by solving equations (7-11) using Gaussian Elimination method

$$\alpha_0 = \frac{1}{24h^2} \left[24y_n h x_n + 24y_n h^2 - 24x_n y_{n+1} h + 7x_n f_n h^3 + 12x_n^2 f_n h^2 + 6x_n^3 f_n h + x_n^4 f_n + 6x_n f_{n+1} h^3 \right. \\ \left. - 8x_n^3 f_{n+1} h - 2x_n^4 f_{n+1} - x_n f_{n+3} h^3 + 2x_n^3 f_{n+2} h + x_n^4 f_{n+2} \right]$$

$$\alpha_1 = \frac{1}{24h^2} \left[24y_n h - 24x_n y_{n+1} h + 7x_n f_n h^3 + 24f_n x_n h^2 + 18x_n^2 f_n h + 4x_n^3 f_n + 6f_{n+1} h^3 - 24x_n^2 f_{n+1} h \right. \\ \left. - 8x_n^3 f_{n+1} - f_{n+2} h^3 + 6x_n^2 f_{n+2} h + 4x_n^3 f_{n+2} \right]$$

$$\alpha_2 = -\frac{1}{2h^2} \left[2f_n h^2 + 3x_n f_n h + x_n^2 f_n - 2x_n^2 f_{n+1} - 4x_n f_{n+1} h + x_n^2 f_{n+2} + x_n f_{n+2} h \right]$$

$$\alpha_3 = -\frac{1}{2h^2} \left[3f_n h + 2x_n f_n - 4x_n f_{n+1} h - 4x_n f_{n+1} h - 4h f_{n+2} + 2x_n f_{n+2} + f_{n+2} h \right]$$

$$\alpha_4 = \frac{1}{h^2} [f_n - 2f_{n+1} + f_{n+2}]$$

Putting the values of $\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4$ into equation (4) and evaluating at x_{n+2} , to get the scheme below:

$$y_{n+2} - 2y_{n+1} + y_n = \frac{h^2}{2} [f_{n+2} + 10f_{n+1} + f_n] \quad (12)$$

Solution

$$y_{n+2} = 2y_{n+1} - y_n + \frac{h^2}{2} [F_{n+2} + 10F_{n+1} + F_n] \quad (13)$$

For $n = 0$ to 10

Solving for $n = 0$

The scheme becomes;

$$y_2 = 2y_1 - y_0 + \frac{h^2}{2} [F_2 + 10F_1 + F_0]$$

Solving for y_1 since the scheme is an implicit scheme

We use Taylor series as the predictor-corrector

$$y'' = -yy''' = -y'y^{iv} = -y''y^v = -y'''$$

$$y_{n+1} = y(x_n + h) = y(x_n) + hy'(x_n) + \frac{1}{2!} h^2 y''(x_n) + \frac{1}{3!} h^3 y'''(x_n) + \dots$$

For $n = 0$, where $h = 0.001$

$$y_1 = 1 + (0.001)(1) + \frac{1}{2}(0.001)^2(-1) + \frac{1}{6}(0.001)^3(-1) + \dots$$

Computing the values above, we have;

$$y_1 = 1.000995$$

$$f_{n+1} = y''(x_n + h) = y''(x_n) + hy'''(x_n) + \frac{1}{2!} h^2 y^{iv}(x_n) + \frac{1}{3!} h^3 y^v(x_n) + \dots$$

For $n = 0$, where $h = 0.001$

$$f_1 = -1 + (0.001)(-1) + \frac{1}{2}(0.001)^2(1) + \frac{1}{6}(0.001)^3(1) + \dots$$

Computing the values above, we have;

$$f_1 = -1.000995$$

$$f_{n+2} = y''(x_n + 2h) = y''(x_n) + 2hy'''(x_n) + \frac{1}{2!}(2h)^2 y^{iv}(x_n) + \frac{1}{3!}(2h)^3 y^v(x_n) + \dots$$

For n = 0, where h = 0.001

$$f_2 = -1 + (0.001)(-1) + \frac{1}{2}(2 \times 0.001)^2(1) + \frac{1}{6}(2 \times 0.001)^3(1) + \dots$$

Computing the values above, we have;

$$f_2 = -1.001998$$

$$f_n = y''(x_n)$$

For n = 0, where h = 0.001

$$f_1 = -1$$

Putting the values back into the scheme below

$$y_2 = 2y_1 - y_0 + \frac{h^2}{2}[F_2 + 10F_1 + F_0]$$

$$y_2 = 2(1.000995) - 1 + \frac{0.001^2}{2}[-1.001998 - 10(1.000995) - 1]$$

Computing the values above, we have;

$$y_2 = 1.001984$$

Going back all over again to solve for n = 1...10 will take a lot of time and computational accuracy will not be there.

Using A Python Program To Solve The Problem

#program to calculate...

Import math

y = [0,0,0,0,0,0,0,0,0,0]

f = [0,0,0,0,0,0,0,0,0,0]

h = 0.001

#h = input("Enter the value for h: ")

yp = 1

ypp = -1

yppp = -1

ypppp = 1

yppppp = 1

ypppppp = -1

yppppppp = -1

y(0) = 1

y[0] = y0 + (h * yp) + ((h**2 * ypp)/2) + ((h**3 * yppp)/6) + ((h**4 * ypppp)/24) + ((h**5 * yppppp)/120) + ((h**6 * ypppppp)/720) + ((h**7 * yppppppp)/5040)

f[0] = -(y0)

f[1] = -(y[0])

n = 2;

for i in range(1, 10):

f[i+1] = y0 + (n*h * yp) + (((n*h)**2) * ypp)/2 + (((n*h)**3 * yppp)/6) + (((n*h)**4 * ypppp)/24) + (((n*h)**5 * yppppp)/120) + (((n*h)**6 * ypppppp)/720) + (((n*h)**7 * yppppppp)/5040)

y[i] = (2 * y[i-1]) - y0 + ((h**2)/2) * (f[i+1] + (10 * f[i]) + f[i-1])

n += 1

f[i] = f[i-1]

f[i+1] = f[i]

y0 = y[i-1]

```

for j in range(10):
    print(str(y[j]) + "\t")

#Exact values
exact = [0,0,0,0,0,0,0,0,0,0]
print("-----[ EXACT VALUES ]-----")
x = h
c = 0
if (x >= 0.01):
    lastval = (x * 10)
else:
    lastval = (x * 10) + x

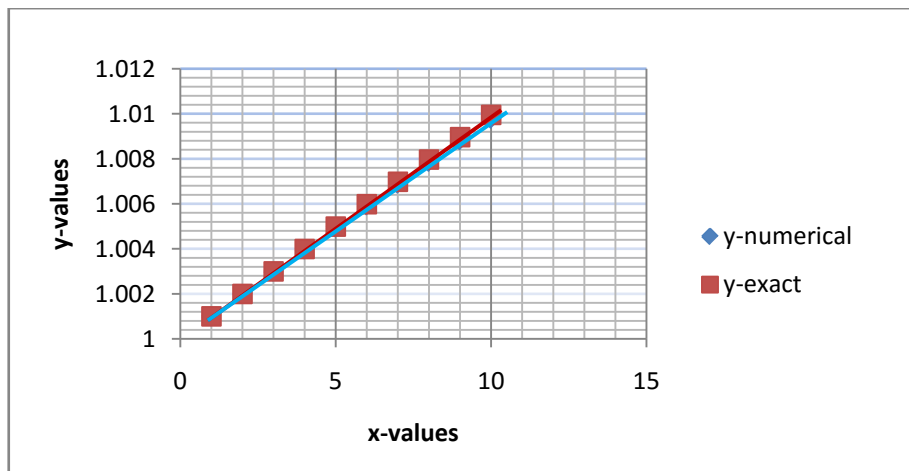
while x <= lastval:
    a = math.cos(x) + math.sin(x)
    print(a)
    exact[c] = a
    x += h
    c += 1
print("-----[ DIFFERENCE ]-----")
for e in range(10):
    print(y[e] - exact[e])
    
```

Result Table

	Y-NUMERICAL	Y-EXACT	ERROR
1	1.0009994998333749	1.000999499833375	$2.220446049250313 \times 10^{-16}$
2	1.00199399566825	1.0019979986673335	$4.00299908354107 \times 10^{-6}$
3	1.0029834935006228	1.002995495503377	$1.2002002754307739 \times 10^{-5}$
4	1.003967994325988	1.0039919893440086	$2.399501802052839 \times 10^{-5}$
5	1.0049474991368397	1.0049874791927345	$3.998005589478382 \times 10^{-5}$
6	1.0059220089226706	1.0059819640540648	$5.9955131394229255 \times 10^{-5}$
7	1.0068915246699726	1.006975442933515	$8.391826354237075 \times 10^{-5}$
8	1.0078560473622364	1.0079679148376062	$1.118674753697313 \times 10^{-4}$
9	1.0088155779799521	1.0089593787738662	$1.4380079391407286 \times 10^{-4}$
10	1.0097701175006084	1.009949833750832	$1.7971625022350501 \times 10^{-4}$

From the table above, the use of Python (a Programming Language) has enabled us to solve the differential equation with different values of x. Furthermore, we are able to get the series of y-numerical and y-exact with their difference without much stress.

With the help of digital age, the result obtained in the table above can be further interpreted by plotting a graph that shows the difference between the y-numerical and y-exact.



b) *Automated Theorem Proving*

Automated Theorem Proving is an area of study to get computers to prove logical and mathematical statements. Not just enumerating instances of a theorem exhaustively, but applying logical deduction, induction, inference and search strategies (depth first, breadth first, best first, iterative deepening) to arrive at a solution. There are branches of Mathematics such as Model theory and Proof Theory which study proofs themselves. Automated theorem proving is a subfield of automated reasoning and mathematical logic dealing with proving mathematical theorem by computer programs. Example of Theorem-proving packages is Microsoft's Z3 [4].

III. SUMMARY AND CONCLUSION

Computers have changed the way mathematics progresses. The Digital age has made available for researchers indispensable hardware and software tools that can effortlessly assist in various ways to make research in mathematics easier, faster and motivating. This assistance covers areas such as number theory, calculus, differential equations and linear algebra among others. These resources come with many hundreds of built-in functions, extensive features for manipulating these functions, and a high-level computer language that allows one to easily create functions and procedures of their own. Mathematical research with the help of digital technology has made research to be easier and faster. Therefore mathematics research is more interesting and encouraging in digital age.

REFERENCES RÉFÉRENCES REFERENCIAS

1. Monaghan, J.(2000) Some issues surrounding the use of algebraic calculators in traditional examinations. *International Journal of Mathematical Education in Science & Technology*,31(3): p. 381-392.
2. Cockcroft, W (1982). *Mathematics counts*. Department of Education and Skills: London.
3. Shuttleworth, M. (2008) definition of research through <https://en.wikipedia.org/wiki/Research>
4. Weist, L.R. (2001).The role of computers in mathematics teaching and Learning. In *Using Information Technology in Mathematics Education*. D.J. Tooke and N.Henderson, 41 – 55. Bing hampton, NY: Haworth Press.
5. Castells, M . (1999)The information age, Volume 1-3: economy, society and culture [Https://en.m.wikipedia.org/wiki/digital age](https://en.m.wikipedia.org/wiki/digital%20age).
6. Hilbert, M. and Lopez, P. (2011), *Science Journal*, 332(6025),60- 65.
7. Aladjev, V.Z. (2004). *Computer algebra systems: a new software toolbox for Maple*. [S.l.]: Fultus Books. p.9. ISBN 9781596820005.
8. Nonweiler T. R., 1986. *Computational Mathematics: An Introduction to Numerical Approximation*, John Wiley and Sons.
9. Ruthven, K. (2008) The Interpretative Flexibility, Instrumental Evolution, and Institutional Adoption of Mathematical Software in Educational Practice: The examples of *Computer Algebra and Dynamic Geometry*. *Journal of Educational Computing Research*, 39(4): p. pp. 379-394.
10. Teleman F. (1990), As Math Grows More Complex, Will Computers Reign? Through <http://www.wired.com/2013/03/computers-and-math/>.



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Socio-Economic Conditions and Professional Upliftment Avenues of SC's & OBC's in Sondh Village of Mewat District (Haryana)

By Gagandeep Singh Narula & Dr. Subhan Khan
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Abstract- The paper provides bird's eye view of rural scheduled caste population of Sondh village in Mewat District (Haryana). It makes readers aware of various demographic entities like population according to Census 2011, Literacy rate, list of backward and scheduled castes in Haryana state and many more.

Readers are able to acquire most of the information about Sondh village from the requisite paper.

Keywords: GIS, satellite imagery, SC's, OBC's, sondh village and mewat district (haryana).

GJCST-H Classification: H.2.8



Strictly as per the compliance and regulations of:



Socio-Economic Conditions and Professional Upliftment Avenues of SC's & OBC's in Sondh Village of Mewat District (Haryana)

Gagandeep Singh Narula ^α & Dr. Subhan Khan ^σ

Abstract The paper provides bird's eye view of rural scheduled caste population of Sondh village in Mewat District (Haryana). It makes readers aware of various demographic entities like population according to Census 2011, Literacy rate, list of backward and scheduled castes in Haryana state and many more.

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I. INTRODUCTION

The condition of rural scheduled caste population in Mewat district, and particularly in Sondh village was found very bad and challenging. The villagers of Sondh were mainly Scheduled Castes (SCs) and Backward Classes (OBCs) which were economically, socially and educationally most backward lot.

The traditional occupation of scheduled caste population was mainly of menial works like scavenging, street cleaning, garbage collection, animal carcass collection, leather goods making in households, etc that were done in very traditional manner without any exposure of scientific and technological innovations in these fields.. Their marketing system was also found rudimentary. Thus, problems existed and need to be addressed include all such related to SCs and OBCs.

Mewat district of Haryana has been identified as one of the backward and minority concentrated districts that severely lag behind in terms of socio-economic parameters of development. A little historical background of the cultural region called Mewat, which was later formed into the 20th district of Haryana, (Map 1 as shown in Fig 1).

II. MEWAT DISTRICT PROFILE

Even after India's independence and the formation of Haryana state in 1966, Mewat region remained socio-economic and political backward. It remained backward even after the agricultural prosperity which that Haryana state experienced during green

revolution in decades of 1970's and 1980's. Paradoxically, the proximity to the national capital region made Gurgaon District a new millennium hub as an industrial centre in the 1990's. The areas which were demarcated for Mewat district in 2005 remained agriculturally and industrially backward and it lacked vital infrastructure such as education, health, basic amenities viz. railway links for the development of transport and commerce etc. The newly created district with name Mewat had total population of 9.93 lakhs as per 2001, out of which 95.36 per cent was rural and just about 4.64 per cent urban. The population of the minority community, which are the Muslims, account for 70.9 % of the total, with 74.3 % of them being rural population. Majority of the Muslims living in Mewat district are called Meos and currently are listed under the Other Backward Classes (OBCs).

The literacy rate recorded in Mewat district was very low, i.e. 44.07 %. It consisted of 61.53 % of literate males as against 24.26 % literate females. In comparison to the state average literacy of 68.59 %, there was a gap of nearly 24 %. The male-female gap in literacy rates within the district was about 37 %. The sex ratio of Mewat was 894 against the state average of 861 which suggests better sex ratio in comparison to the state figure, but much worse in comparison to the national average of 927. Only 40 % of population constitutes the active workforce. Out of them 35.9% per cent were engaged in cultivation. In the Mewat district, 88.31 % of land falls in the cultivable area, while the net area sown is 76.80. The next to agriculture, dairy is the alternate source of their livelihood as 47.79 % of people were keeping buffalos.

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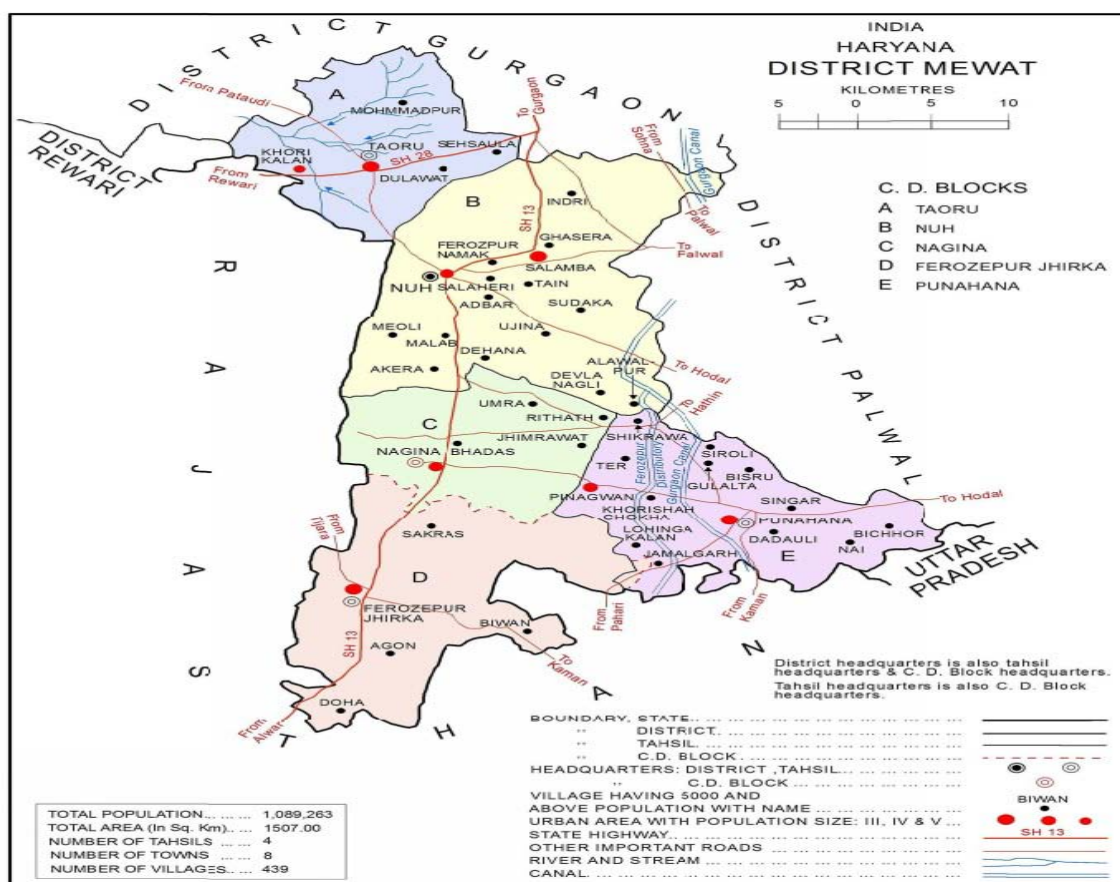


Fig. 1 : Map of District Mewat (Haryana)

a) Administrative set up of Mewat District

Mewat district headquarter is at Nuh and have total population 1,089,263 as per 2011 census, sex ratio (per 1000) is 907 and average literacy ratio is 54.08%. The Mewat district, as per latest census 2011, is constrained 4 tehsils, viz. Taoru (84 villages & 2 towns, Taoru & Khoru Kalan); Nuh (118 villages & 2 towns, Nuh & Salamba), Ferozepur Jhirka (145 villages & 2 towns, Ferozepur Jhirka & Nagina) and Punhana (95 villages & 2 towns, Punhana & Pingwan) [2]. The Table 1 is providing changes in rural-urban areas between census 2001 and 2011.

Table1 : Admin set up of Mewat

Name of Tehsils	Number of Villages		Number of Towns	
	2001	2011	2001	2011
Taoru	84	81	1	2
Nuh	119	118	1	2
Ferozepur Jhirka	146	145	1	2
Punhana	96	95	1	2
District Mewat	-	439	4	8

b) Common changes occurred in the district

Some Salient features of Mewat district as per 2011 census [1] are as follows.

- 12th position in population
- 5th position in population density
- 1st in sex ratio
- 1st in child (0 to 6 years) sex ratio
- 6.9% Scheduled case population
- 54.1%, in literacy rate which is last place in Haryana
- 69.9% in male literacy rate (increased from 61% in 2001)
- 36.6% in Female literacy rate (increased from 23.7% in 2001)
- Work participation rate(WPR) is 26.6%
- Work participation rate(WPR) of males is 39.3%
- Work participation rate(WPR) of females is 12.6%
- Cultivators to total workers were 35.9% (decreased from 42.1% in 2001)
- Agricultural labourers to total workers is 19.1%(increased from 13% in 2001)
- Household Industry Workers to total workers were 2.1% in comparison to 2.9% in Haryana

- Other workers to total workers were 42.9% in comparison to 52.1% in Haryana
- The district is also deficient in educational infrastructure. It has 3 colleges and only one polytechnic and 7 ITI/VEI which reveals the precarious situation of educational facilities.
- Primary schools exist in 78.14 per cent of the villages, but there is a short fall of Middle, High School and Senior Secondary Schools which is 9.30, 6.91 & 3.77 per cent respectively. Therefore girls' formal education suffers from neglect. The girls belonging to Muslim communities prefer to go to *Madarasas* and not to high schools which are not located in the village.
- The district has poor health infrastructure. The PHC's cover just 10 per cent of population, while the sub-centres, which lack trained medical professionals, cover 64.71 per cent of population. Therefore, the response to institutional delivery is not encouraging. Due to the lack of qualified medical professionals, quacks have good business in villages.

III. GOVT. RECOGNIZED/APPROVED SC'S & OBC'S IN HARYANA

It will be relevant to note that the Mewat district is mostly inhabited by a numerically preponderant ethnic group called Meos and with communal good co-existence with scheduled castes (SCs), a list of Govt. recognized/approved SCs given in Table 3 and Other Backward Classes (OBCs) in Table 4 respectively.

IV. SONDH VILLAGE-THE STUDY AREA

Sondh village is located in Block/Tehsil Taoru, district Mewat (Haryana). As per Census 2011 information the location code or village code of Sondh village is 063012. It is one of the 81 villages of Block/Tehsil Deengaheri and Sonika. Taoru is nearest town to Sondh village.

The Google map (Map: 2) in figure 2 shows the location of Sondh village on Taoru road which is the nearest town. Other nearby villages of it are Nanduki, Bhango, Kharak Sohna, Jalalpur Sohna, Chehalaka, Dalawas, Kuliaka, Goela, Deengaheri, Sonika and Guddhi.

a) Sondh Population viz-a-viz Mewat District and Haryana State

As per latest Population Census 2011, Sondh is a large village located in Taoru Tehsil of Mewat district in Haryana. Sondh village has total 520 families, with population of 3,216 out of which 1,663 are males while 1553 are females.

In Sondh village population of children with age 0-6 is 674 which make up 20.96 % of total population of

village. Average Sex Ratio of Sondh village is 934 which are higher than Haryana state average of 879. Child Sex Ratio for the Sondh as per census is 915, higher than Haryana average of 834.

Sondh village has lower literacy rate compared to Haryana. In 2011, literacy rate of Sondh village was 64.75 % compared to 75.55 % of Haryana. In Sondh Male literacy stands at 80.24 % while female literacy rate was 48.25 %.

As per constitution of India and Panchayati Raj Act, Sondh village is administrated by Sarpanch (Head of Village) who is elected representative of village.

Table 2 : Census Data (2011) of Sondh on Major Parameters [1]

Particulars	Total	Male	Female
Total No. of Houses	520	-	-
Population	3,216	1,663	1,553
Child (0-6)	674	352	322
Schedule Caste	1,438	763	675
Schedule Tribe	0	0	0
Literacy	64.75 %	80.24 %	48.25 %
Total Workers	889	659	230
Main Worker	657	0	0
Marginal Worker	232	94	138

b) Caste Factor in Sondh Village

In Sondh village, most of the villagers are from Schedule Caste (SC), which constitutes 44.71 % of total population in Sondh village. A large majority in this village belong to SC& OBC castes.

c) Work Profile in Sondh Village

Sondh village out of total population, 889 were engaged in work activities. 73.90 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 26.10 % were involved in Marginal activity providing livelihood for less than 6 months. Of 889 workers engaged in Main Work, 158 were cultivators (owner or co-owner) while 115 were Agricultural laborers.

Table 3 : List of SC's in Haryana State [1]

Sr No.	Name of the Caste
1	Ad Dharmi
2	Balmiki, Chura, Bhangji
3	Bangali
4	Barar, Burar, Berar
5	Batwal
6	Bauria, Bawaria
7	Bazigar
8	Bhanjra
9	Chamar, JatiaChamar, Rehgar, Raigar, Ramdasi, Ravidasi, Balahi, Batoi, Bhato, Bhambi, Chamar-Rohidas, Jatav, Jatava, Mochi, Ramdasia.
10	Chanal
11	Dagi
12	Darain
13	Deha, Dhaya, Dhea
14	Dhanak
15	Dhogri, Dhangri, Saggi
16	Dumna, Mahasha, Doom
17	Gagra
18	Gandhila, Gandil, Gondola
19	Kabirpanthi, Julaha
20	Khatik
21	Kori, Koli
22	Marija, Marecha
23	Mazhabi, Mazhabi Sikh
24	Megh
25	Nat, Badi
26	Od.
27	Pasi
28	Perna
29	Pherera
30	Sanhai
31	Sanhal
32	Sansi, Bhedkut, Manesh
33	Sansoi
34	Sapela, Sapera
35	Sarera
36	Sikligar, Bariya
37	Sirkiband.

Table 4 : List of OBC's in Haryana state [1]

Sr No.	Name of Caste/Class
Block A:	
1`	Aheria,Aheri,Heri,Naik,Thori or Turi, Hari
2	Barra
3	Beta, Hensi or Hesi
4	Bagria
5	Barwar
6	Barai, Tamboli
7	Baragi, Bairagi, Swami Sadh
8	Battera
9	Bharbhunja, Bharbhuja
10	Bhat, Bhatra, Darpi, Ramiya
11	Bhuhalia, Lohar
12	Changar
13	Chirimar
14	Chang
15	Chimba, Chhipi, Chimpa, Darzi, Rohilla
16	Daiya
17	Dhobis
18	Dakau
19	Dhimar, allah,Kashyap- Rajpoot, Kahar, Jhiwar, Dhinwar, Khewat, Mehra, Nishad, Sakka, Bhisti, Sheikh-Abbasi
20	Dhosali, Dosali
21	Faquir
22	Gwaria, Gauria or Gwar
23	Ghirath
24	Ghasi, Ghasiara or Ghosi
25	Gorkhas
26	Gawala, Gowala
27	Gadaria, Pal, Baghel
28	GarhiLohar
29	Hajjam, Nai, Nais, Sain
30	Jhangra-Brahman, Khati, Suthar, Dhiman-Brahmin, Tarkhan, Barhai, Baddi
31	Joginath, Jogi, Nath, Jangam-Jogi,Yogi
32	Kanjar or Kanchan
33	Kurmi
34	Kumhars, Prajapati
35	Kamboj
36	Khanghera
37	Kuchband
38	Labana
39	Lakhera, Manihar, Kachera
40	Lohar, Panchal-Brahmin
41	Madari
42	Mochi
43	Mirasi
44	Nar
45	Noongar
46	Nalband
47	Pinja, Penja
48	Rehar, Rehara or Re
49	Raigar

50	Rai Sikhs
51	Rechband
52	Shorgir, Shergir
53	Soi
54	Singhikant, Singiwala
55	Sunar, Zargar, Soni
56	Thathera, Tamera
57	Teli
58	Banzara, Banjara
59	Weaver (Jullaha)
60	Badi/Baddon
61	Bhattu/Chattu
62	Mina
63	Rahbari
64	Charan
65	Chaaraj (Mahabrahman)
66	Udasin
67	Ramgarhia
68	Rangrez, Lilgar, Nilgar, Lallari
69	Dawala, Soni-Dawala, Nyaaria
70	Bhar, Rajbhar
71	Nat(Muslim)
Block B:	
1	Ahir/Yadav
2	Gujjar
3	Lodh/Lodha/Lodhi
4	Saini, Shakya, Koeri, Kushwaha, Maurya
5	Meo

Note: At present, Raigar, Mochi, Weaver (Jullaha) (BC) and Julaha (SC) and Badi Castes find a mention in the list of both Scheduled Caste and Backward Classes. The persons belonging to these Castes who do not cover under the Scheduled Caste being Non- Hindu and Non-Sikhs can take the benefit under the Backward Classes only.



Fig. 2 : Location of SONDH village on Taoru road using Google Map

V. CONCLUSION

The given paper provides summarized data of SONDH village according to Census 2011 on basis of various parameters like population, castes (SC's and OBC's), literacy rate, number of workers and their occupation. It is concluded that in Sondh village, most of the villagers are from Schedule Caste (SC), which constitutes 44.71 % of total population in Sondh village.

Work profile of workers is summarized as: 889 were engaged in work activities. 73.90 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 26.10 % were involved in Marginal activity providing livelihood for less than 6 months. Of 889 workers engaged in Main Work, 158 were cultivators (owner or co-owner) while 115 were Agricultural laborers.

As a future scope, work can be extended by applying Geo-spatial technologies for identification & development of household database for SC's & OBC's of Sondh village.

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REFERENCES RÉFÉRENCES REFERENCIAS

1. Census of India 2011, Haryana, Series-07, Part XII-B, District Census Handbook, Mewat, Village and Town Wise Primary Census Abstract (PCA), Directorate of Census Operations, Haryana
2. Identifying Backwardness of Mewat Region in Haryana: A Block-Level Analysis, Study sponsored by Research Division, NITI Ayog, Government of India , Study conducted by S. M. Sehgal Foundation, Gurgaon, June 2015
3. Khan Subhan, Natural Resources Data management System (NRDMS) in Handbook of Libraries, Archives & Information Centers in India, Vol. 7 Science and Technology Information Systems and Centers (Eds.) by B.M. Gupta and S.S. Nathan, Aditya Prakashan, Delhi, pp 1-13
4. Sanay Mondal et.al. "Land Information System using Cadastral techniques, mining area of Raniganj, Barddhaman District, India", International Journal of Remote Sensing Applications (IJRSA), Vol. 5, 2015, ISSN 2226- 4353.

5. Gagandeep Singh Narula, Dr. Subhan Khan, Yogesh. "DST's Mission Mode on Program Natural Resources Data Management System (NRDMS)", BIJIT-BVICAM's International Journal of Information Technology, Jan-June 2016 Vol.8 No.1 pages 973-978 having ISSN No. 0973-5658 with impact factor 0.605, indexed with IET (UK), INSPEC



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Low Power High Gain Op-Amp using Square Root based Current Generator

By D. Anitha, K. Manjunatha Chari, K. Vijaya Krishna & P. Satish Kumar

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Abstract- A very high gain two stage CMOS operational amplifier has been presented. The proposed circuit is implemented in 180nm CMOS technology with a supply voltage of $\pm 0.65V$. The current source in the OPAMP is replaced by a square root based current generator which helps to reduce the impact of process variations on the circuit and low power consumption due to the operation of MOS in subthreshold region. So with the help of square root based current generator the better controllability over gain can be obtained. The proposed opamp shows a high gain of 121.9dB and low power consumption of 11.89uW is achieved.

Keywords : *selfcascode, gain, aspectratio, lowpower, mosfet, opamp.*

GJCST-H Classification: *B.0*



Strictly as per the compliance and regulations of:



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Keywords: selfcascode, gain, aspectratio, lowpower, mosfet, opamp.

I. INTRODUCTION

Operational amplifiers designed using bipolar junction transistor (BJT) consumes more power [1], so they remain unsuitable for most of the modern application specific integrated circuits (ASICs). Op-amps designed using metal-oxide-semiconductor field effect transistor (MOSFETs) is gaining importance in present signal processing architectures [4] due to their potential for low power operation. Their use however impaired by low trans conductance to drain current ratio ($gm/Id \leq 28$) when compared to the Bipolar junction transistors gm/Id ratio of about 40 [4, 5], poor matching and the low output impedance of the strong inversion region [6]. Two stage Operational amplifier, though a two poles system, essentially performs as a single pole system having one dominant pole due to one internal node of the high impedance, the other high impedance node makes non-dominant pole which is kept at sufficiently high frequency, beyond the unity-gain bandwidth (UGB) by utilizing the suitable compensation techniques. These compensation techniques consume considerable chip area and require complex design [7] than dominant pole approach (pole splitting) used in classical Op-amp architecture. Classically, Miller effect was used to reflect a large capacitance to output of the differential high gain first stage. However, a feed-forward path is also available that results in positive zero (affects phase like a pole) thereby reducing phase margin. Usually, a nulling resistance is added in series with compensating capacitor to control position of this zero [4] which also consume additional chip area.

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If the self cascode (SC) structure of Fig. 1 is biased in such a way that transistor M2 operates in the sub threshold region, a very high voltage gain can be obtained and resulting larger capacitance at the output limits its frequency response, a condition advantageous for input differential stage of Operational amplifier.

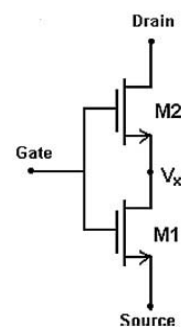


Fig. 1 : Self cascode

In sub threshold region the gm/Id is approximately equal to 28 while in strong inversion region it is much lower than 28. The larger capacitance at the output of input differential stage which in corporate Self Cas code structures can minimize or eliminate the need for an on-chip compensating capacitor thereby reducing occupied chip area. The sub threshold operation of SC additionally results in low power, low distortion and low noise [6] suggests guidelines to optimize Op-amp performance by obtaining higher gain, low power consumption, less distortion and a smaller value of compensating capacitor.

This paper presents a high gain(121.9dB), low power (11.89uW), CMOS Op-amp having structural simplicity of the classical Widlar architecture. Cadence simulations for 0.18um CMOS technology have been carried out at $\pm 0.65V$ supply.

II. OP AMP DESIGN USING SELF CASCODE

The proposed two stage Op-amp has been shown in Fig.2 which utilizes the sub threshold biased Self Cascode structures with the input stage of classical Widlar architecture.

To minimize the need for compensation capacitor, the differential input stage utilized sub threshold biased SC structures based on split length MOSFETs. This has been achieved by sizing Self Cascode transistors with inverse aspect ratio and

operate them with the low bias current to ensure very high gain which is relatively independent of the drain currents and results in reduced non-linear distortion. A higher voltage gain has been achieved due to sub threshold operated transistors resulting in reduced channel length modulation. Since, sub threshold gain and the gain-bandwidth product (GBW) of a MOSFET is a constant quantity, a change in I_{D9} affects band width of the structure.

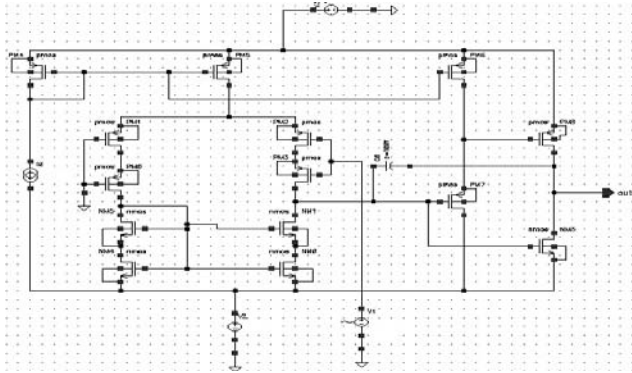


Fig. 2 : High gain opamp structure

Keeping inverting input (V_{in-}) at zero volts and applying the input signal at non-inverting input of Op-amp (V_{pin}), the voltage gain of this stage is

$$ADI = g_{m(eff)} \cdot R_{out(DI)} \quad (1)$$

where, $g_{m(eff)}$ is the effective transconductance of SC consisting of M2a and M2b, and output resistance of differential input stage is given by,

$$R_{out(DI)} = R_{out(SC)2} \parallel R_{out(SC)4} \quad (2)$$

The output stage (M5 to M7 and M10) is used to drive the external loads and require large currents. Due to small bias current of sub threshold biased SC structures, their use at output can be ruled out. Cascode / Regulated cascode structures can be used in place of M5 and M6, as they can deliver very high gain without compromising transistor's UGB [25]. However, position of its dominant pole at low frequency require large compensation capacitance to move this pole at higher frequencies and to make phase margin positive. Additionally, high output compliance voltage due to stacked transistors reduces the output swing by at least $2 V_{ds(sat)}$, while increase in transistor counts increases the consumed chip area and power. Since differential input first stage provide most of the gain, this stage is designed to provide moderate gain ($\approx 20dB$) with very high x_{3dB} (higher than UGB of the first stage) to place poles of this stage at much higher frequency to improve phase margin. Class-AB configuration has been chosen to deliver efficiency of the order of Class-B configuration and to avoid dead zones during transitions. Transistor M7 acts as a level shifter to bias M5 and to set the output quiescent current to ensure low power operation.

Due to very high open loop gains, Op-amps are used with negative feedback and require compensation to avoid Barkhausen's condition for sustained oscillations, thereby ensuring closed loop stability. In the classical pole splitting technique, with the increase in output stage gain, the dominant pole frequency decreases and the non-dominant pole location increases to split the poles apart and to enhance the stability. Under unity gain condition (worstcase scenario) a phase margin of 63° provide the best compromise between rise time and settling time [2].

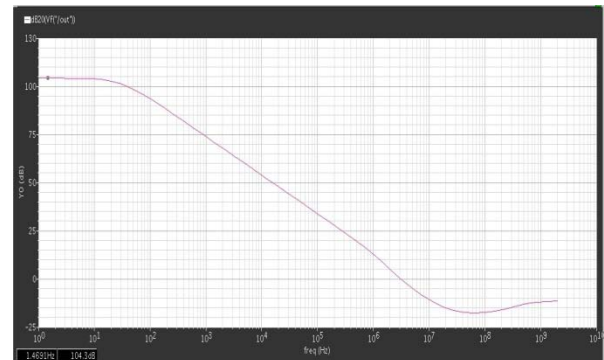


Fig. 3 : AC response of opamp shown in fig.2

In the modified compensation technique utilized here, the aspect ratio of MOSFETs used in the two stages of Opamp are optimized to generate a parasitic capacitance at the output of first stage to minimize the need for additional onchip compensation capacitance of value suitable for good phase margin ($>60^\circ$). Cascoded devices with wider W (M3b and M4b of the differential input first stage) increases their g_m which ultimately reduces the effective resistance ($1/g_{m3b}$) and increases parasitic capacitance C_P [Eq. 11]. The reduction in $1/g_{m3b}$ dominates the increase in C_P , and places the mirror pole at higher frequency, away from the dominant pole. A wider MOSFET (M4b) increases the parasitic capacitance C_Q to further move the dominant pole, towards the origin in the s-plane. The larger channel length devices with subscripts 'a' enhances their output resistances due to reduced channel length modulation which ultimately increases the voltage gain of differential input first stage. The output stage is optimized to deliver highest ω_{3dB} which diminishes the effect of pole from this stage and the mirror pole from input differential stage, resulting in better phase margin ($>60^\circ$) of the Op-amp.

III. SQUARE ROOT BASED CURRENT GENERATOR

A low variation current generator can be designed by choosing the equation $I = \sqrt{I_1 I_2}$. MOS transistors are used to implement the circuit. By using transistors in the sub threshold region, we can implement circuit using a translinear loop, the following equation (see fig.4).

$$I = I_1^{1/(k+1)} \cdot I_2^{k/(k+1)}$$

Where k is the subthreshold coupling coefficient. We note that this equation is dimensionally correct. A circuit implementation of this "feedback" is shown in Fig. 5.

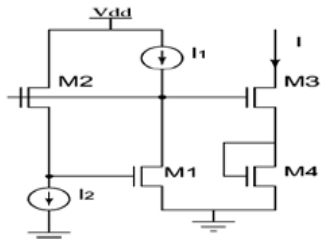


Fig. 4 : Translinear loop

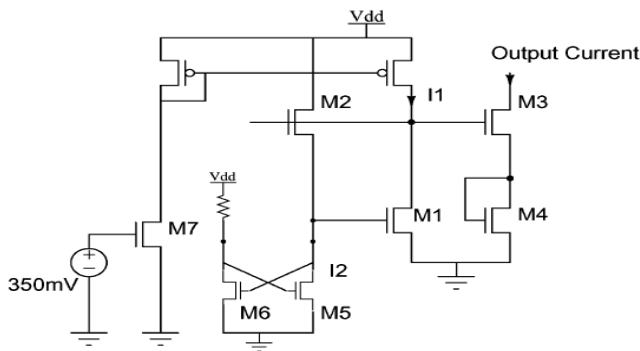


Fig. 5 : Square Root Based circuit

Transistor M6 and the resistor R invert M1 gate voltage. transistor M5 produces I_2 and also adjusts it to negatively correlate with I_1 . The current I_1 itself is generated using an nMOS transistor M7 and mirrored into transistor M1 using a pMOS current mirror. Fig. 6 shows a Monte Carlo scatter plot of I_1 and I_2 . We see from the plot that as I_1 varies with the process, I_2 varies inversely. Also, by plotting I_1 and I_2 on log scales, we verify that $\Delta I_1/I_1$ and $\Delta I_2/I_2$ are linearly related.

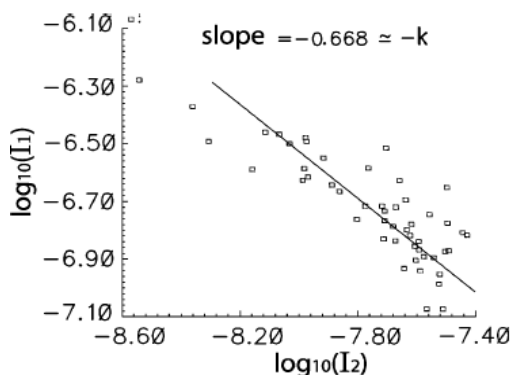


Fig. 6 : Scatter Plot

Fig. 7 shows the Monte Carlo histograms of the input nMOS transistor current and the output of the square-root circuit. We obtain an improvement of a factor of three in the current spread. These simulations include all the variations, including the mismatches between the local transistors, variations in A (the gain of the common source stage).

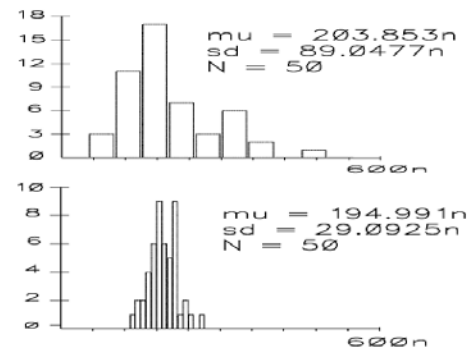


Fig. 7 : Histograms of the output current from a single transistor (top) and square-root circuit (bottom)

These do not get reflected output current variations as the negative correlation between the $\Delta I_1/I_1$ and $\Delta I_2/I_2$ is still maintained. Only the proportionality constant is being modified. Thus, these variations are suppressed to the first order. Also note that this result does not include the impact of the changes on the gate of transistor M7.

IV. PROPOSED ARCHITECTURE

In the proposed architecture we replace the current source of the opamp (see Fig.2) with the above discussed square root based current generator which help in reduce impact of process variations on the circuit and help in reduce post fabrication efforts. So with the help of square root based current generator the better controllability over gain can be obtained.

Fig. 8 shows the proposed architecture having square based current generator. and the AC frequency response is shown in fig.9. we observe that the circuit exhibits a higher gain of 121.9dB and also consumes a very less power of 11.89 μW due to the subthreshold region operation of MOSFETS in square root based generator..

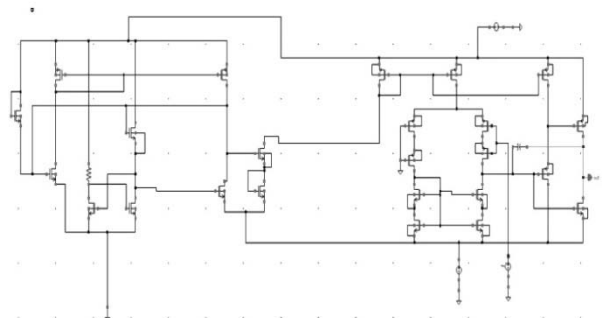


Fig. 8 : Proposed architecture

V. MEASURED RESULTS

A high gain low power opamp has been designed by replacing the ideal current source in fig.(2), by a single MOSFET which is shown in work [1] and the outputs are compared to verify the circuit sqrt based current source i.e proposed architecture operation at different conditions.

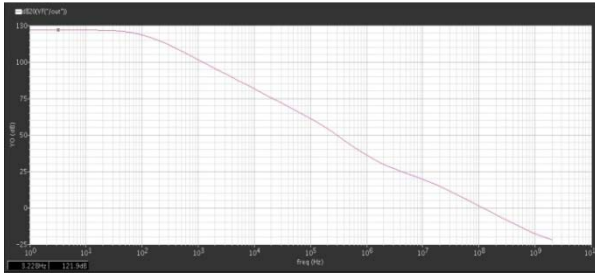


Fig. 9 : AC response of proposed architecture

Figure 10 shows the gain at different temperatures. It can be observed that the temperature variations are less compared to that of existing work[1]. The power dissipation of the proposed work is shown in fig 10.

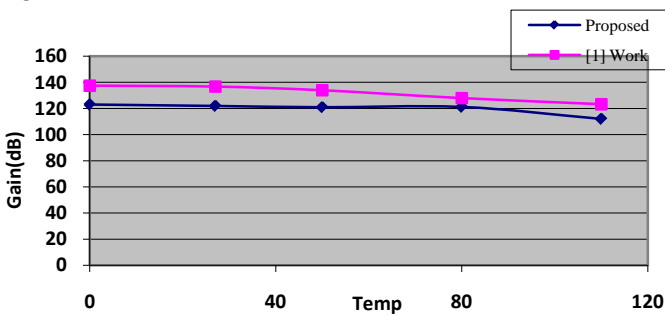


Fig. 10 : Gain at different temperatures

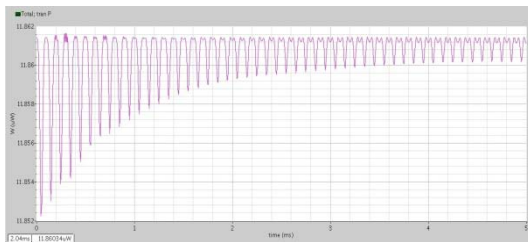


Fig.11 : Power consumption of the proposed structure

The power consumption of proposed architecture at different temperatures can be seen infig.12.

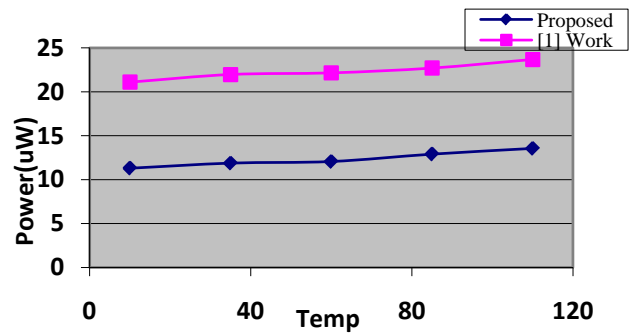


Fig.12 : Power Consumption at different temperatures

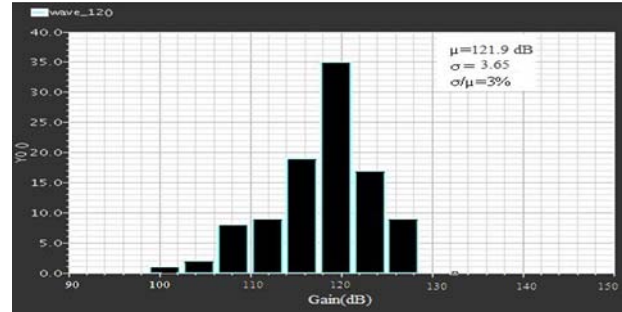


Figure 13 : Histogram of gain for proposed architecture

By taking V_{th} and T_{ox} variations of 10% into consideration the statistical analysis has been performed and the histogram of gain is shown in fig. 13. A low variation of standard deviation over mean of 2.9% is achieved by using the proposed opamp.

The following table shows the comparison between the proposed work and the reference work.

Table I: Comparison of present work and proposed work

Parameter	OPAMP in fig.2 (current source is replaced by a MOSFET)	Sqrt based current source OPAMP
Power	21.1uW	11.89uW
Technology	250nm	180nm
Phase Margin	62.1	60.3
Supply voltage	$\pm 1V$	$\pm 0.65V$
SR+/SR-(V/us)	2.285/2.339	4.67/4.46
UGB	3MHZ	10MHZ
Open loop gain	127db	121.9db

VI. SUMMARY

Hence an ultra high gain, low power process, temperature compensated opamp has been designed in CMOS 180nm process and with a gain of 121.9dB and low power of 11.89 μW . though the gain is reduced compared to the existing OPAMP, a better UGB, tolerance to process, temperature variations and low

power of 11.89uW has been achieved with the replacement of current source by the Square based current generator as the current source in the OPAMP.

REFERENCES RÉFÉRENCES REFERENCIAS

1. Prateek Vajpayee, "An ultra-high gain low power two stage CMOS op-amp based on inverse aspect ratio self cascode structures"
2. Anand M. Pappu, Xuan Zhang, Andre V. Harrison, and Alyssa B. Apsel" Process-Invariant Current Source Design:Methodology and Examples"
3. Lee, T. H. (2002). "IC Op-Amps Through the Ages", Stanford University: Handout # 18, EE214, Fall 2002.K. Elissa,
4. Sansen, W. (2006). Analog design essentials (Vol. 859)., The international series in engineering and computer science Dordrecht: Springer.
5. Silveira, F., Flandre, D., & Jespers, P. (1996). A gm/ID based methodology for the design of CMOS analog circuits and its application to the synthesis of a silicon-on-insulator micropower OTA. IEEE Journal of Solid-State Circuits, 31(9), 1314–1319.
6. Binkley, D. M., Blalock, B. J., & Rochelle, J. M. (2006). Optimizing drain current, inversion level, and channel length in analog CMOS design. Analog Integrated Circuits and Signal Processing journal, 47, 137–163.
7. Allen, P. E., & Holberg, D. R. (2002). CMOS analog circuit design (2nd ed.). New York: Oxford University Press.
8. Lee, T. H. (2007). Tales of the continuum: A subsampled history of analog circuits. IEEE Solid-State Circuits Newsletter, 12(4),38–51.



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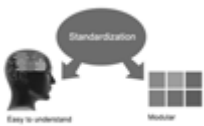
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2. Ethical Guidelines,
3. Submission of Manuscripts,
4. Manuscript's Category,
5. Structure and Format of Manuscript,
6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

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2. ETHICAL GUIDELINES

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- 2) Drafting the paper and revising it critically regarding important academic content.
- 3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

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Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.



To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications.

Research letters: The letters are small and concise comments on previously published matters.

5. STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also. Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

- (a) Title should be relevant and commensurate with the theme of the paper.
- (b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.
- (c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.
- (d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.
- (e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.
- (f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;
- (g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.
- (h) Brief Acknowledgements.
- (i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.



The Editorial Board reserves the right to make literary corrections and to make suggestions to improve brevity.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than $1.4 \times 10^{-3} \text{ m}^3$, or 4 mm somewhat than $4 \times 10^{-3} \text{ m}$. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art. A few tips for deciding as strategically as possible about keyword search:



- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

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Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

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6.4 Author Material Archive Policy

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

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Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.



12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.



27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium through which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.



Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

- Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

- Use standard writing style including articles ("a", "the," etc.)
- Keep on paying attention on the research topic of the paper
- Use paragraphs to split each significant point (excluding for the abstract)
- Align the primary line of each section
- Present your points in sound order
- Use present tense to report well accepted
- Use past tense to describe specific results
- Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives
- Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.



Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript-- must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.



- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently. You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.



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Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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