



**PARUL UNIVERSITY**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES**  
**4<sup>th</sup> SEMESTER B. TECH PROGRAMME**  
**PROBABILITY, STATISTICS AND NUMERICAL METHODS (303191251)**  
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### Tutorial 3 : Solutions of a System of Linear Equations

<b>1</b>	<b>Solve the following system of equations using Gauss-Seidel method</b>	
	1	$8x + y + z = 5$ , $x + 8y + z = 5$ , $x + y + 8z = 5$ correct up to four decimal places.
	2	$25x + 2y - 3z = 48$ , $3x + 27y - 2z = 56$ , $x + 2y + 23z = 52$ starting with (1,1,0) correct up to four decimal places.
	3	$2x + y + 6z = 9$ , $8x + 3y + 2z = 13$ , $x + 5y + z = 7$ correct up to three decimal places.
	4	$x + 2y + z = 0$ , $3x + y - z = 0$ , $x - y + 4z = 3$ starting with (1,1,1) correct up three decimal places.
<b>2</b>	<b>Solve the following system of equations using Gauss-Jacobi method</b>	
	1	$6x + 2y - z = 4$ , $x + 5y + z = 3$ , $2x + y + 4z = 27$ correct up to two decimal places.
	2	$8x - y + 2z = 13$ , $x - 10y + 3z = 17$ , $3x + 2y + 12z = 25$ correct up to four decimal places.
	3.	$15x - 2y + 2z = 15$ , $2x - 16y - z = 15$ , $2x + y - 17z = 14$ , up to three decimal places
	4	$20x + y - 2z = 17$ , $3x + 20y - z = -18$ , $2x - 3y + 20z = 25$ , up to three decimal places

### Roots of Algebraic and Transcendental Equations

<b>1</b>	<b>Bisection Method</b>	
	1	Find the positive root of $x^3 - 2x - 5 = 0$ correct up to two decimal places.
	2	Find a real root between 0 and 1 of the equation $e^{-x} - x = 0$ , correct up to three decimal places
<b>2</b>	<b>Regula-Falsi (False-Position) Method</b>	
	1	Find a positive root of $x^3 - 4x + 1 = 0$ correct up to three decimal places.

	2	Find a real root of the equation $x^{\log_{10} x} = 1.2$ , correct up to three decimal places
<b>3</b>	<b>Newton-Raphson Method</b>	
	1	Find the root of $x^4 - x - 10 = 0$ correct up to three decimal places.
	2	Find a positive root of the equation $x = \cos x$ correct up to three decimal places.
	3	Derive the iterative formula for $\sqrt[k]{N}$ , where N is a positive number and evaluate $\sqrt[3]{58}$ correct up to three decimal places.
	4	Derive the iterative formula for $\sqrt{N}$ , where N is a positive number and evaluate $\sqrt{28}$ correct up to three decimal places.
	5	Derive the iterative formula for $\frac{1}{N}$ , where N is a positive number and evaluate $\frac{1}{13}$ correct up to three decimal places.
	6	Derive the iterative formula for $\frac{1}{\sqrt{N}}$ , where N is a positive number and evaluate $\frac{1}{\sqrt{2}}$ correct up to three decimal places.