Quiz 1

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Kelas : Informatika - E

Metode Jacobi

$x_1 - x_2 + x_3 - 2x_4 = 8$

$2x_1 - 2x_2 + 2x_3 - x_4 = 5$

$-x_1 - x_2 + 2x_3 - x_4 = 4$

$x_1 + 2x_2 + 4x_3 + x_4 = 5$

$\varepsilon = 0{,}0001$

$x_1 = 8 + x_2 - x_3 + 2x_4 \;/\; 1$

$x_2 = 5 - 2x_1 - 2x_3 + x_4 \;/\; 1$

$x_3 = 4 + x_1 - x_2 + x_4 \;/\; 2$

$x_4 = 5 - x_1 - 2x_2 - 4x_3 \;/\; 1$

- Iterasi Pertama : $x_1, x_2, x_3, x_4 = 0$

- Iterasi kedua :

$x_1' = (8 + x_2^0 - x_3^0 + 2x_4^0) / 1 = 8/1 = 8$ $\quad \varepsilon_{x_1} = 100\%$

$x_2' = (5 - 2x_1^0 - 2x_3^0 + x_4^0) / 1 = 5/1 = 5$ hitung error $\quad \varepsilon_{x_2} = 100\%$

$x_3' = (4 + x_1^0 - x_2^0 + x_4^0) / 2 = 4/2 = 2$ $\quad \varepsilon_{x_3} = 100\%$

$x_4' = (5 - x_1^0 - 2x_2 - 4x_3^0) / 1 = 5/1 = 5$ $\quad \varepsilon_{x_4} = 100\%$

- Iterasi ke tiga :

$x_1^2 = (8 + (5) - (2) + 2(5)) / 1 = 21$

$x_2^2 = (5 - 2(8) - 2(2) + (5)) / 1 = -10$

$x_3^2 = (4 + (8) - (5) + (5)) / 2 = 6$

$x_4^2 = (5 - 8 - 2(5) - 4(2)) / 1 = -21$

hitung error :

$\varepsilon_{x_1} = \dfrac{21 - 8}{21} \cdot 100\% = 61{,}9048\%$

$\varepsilon_{x_2} = 150\%$

$\varepsilon_{x_3} = 66{,}6667\%$

$\varepsilon_{x_4} = 121{,}8095\%$

Iterasi 9 :

$x_1^3 = (8 + (-10) - 6 + 2(-21))/1 = -50$

$x_2^3 = (5 - 2(21) - 2(6) + (-21))/1 = -70$

$x_3^3 = (4 + 21 - (-10) + (-21))/2 = 7$

$x_4^3 = (5 - 21 - 2(-10) - 1(6))/1 = -20$

Hitung error :

$$\varepsilon x_1 = \frac{x_1^3 - x_1^2}{x_1^3} = \frac{-50 - 21}{-50} \cdot 100\% = 142\%$$

$\varepsilon x_2 = 85\%$

$\varepsilon x_3 = 14,2\%$

$\varepsilon x_4 = 5\%$

Iterasi	x_1	x_2	x_3	x_4	εx_1	εx_2	εx_3	εx_4
1	0	0	0	0				
2	8	5	2	5	100%	100%	100%	100%
3	21	-10	6	-21	61,9048%	150%	66,6667%	123,8095%
4	-50	-70	7	-20	142%	85,7143%	14,2857%	5%
5	-109	71	2	167	54,1284%	198,5915%	250%	111,9760%
6	411	386	-9,5	-36	126,5207%	81,6062%	121,0526%	563,8889%
7	926,5	-844	-3,5	-1160	55,8806%	145,7346%	28,5714%	96,8966%
8	-3152,5	-1801	7,25	13805	110,3569%	53,1371%	148,2759%	184,0275%
9	960,75	7676	16,5	67305	428,1291%	123,4627%	56,0606%	79,4889%
10	21128,5	4781	9,625	-16373,8	95,4528%	60,5522%	71,4286%	141,1054%