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~~Soal~~

Jawab :

① $\sin(x) = \sin(0) + \frac{(x-0)}{1!}\cos(0) + \frac{(x-0)^2}{2!}(-\sin(0)) + \frac{(x-0)^3}{3!}(-\cos(0))$
$+ \frac{(x-0)^4}{4!}\sin(0) + \dots$
$= x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots$

② $\cos(x) = \cos(0) + \frac{(x-0)}{1!}(-\sin(0)) + \frac{(x-0)^2}{2!}(-\cos(0))$
$+ \frac{(x-0)^3}{3!}\sin(0) + \frac{(x-0)^4}{4!}\cos(0)$
$= 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$

③ gaus jordan
$4x - 3y + 10z = 6$
$3x - 2y + 7z = 3$
$2x - y + 5z = 4$
Gaus jordan Elimination

$$\left[\begin{array}{ccc|c} 4 & -3 & 10 & 6 \\ 3 & -2 & 7 & 3 \\ 2 & -1 & 5 & 4 \end{array}\right]$$

- Untuk mengubah Row 1 menjadi 1 maka $\frac{R_1}{4}$

$R_{1_1} = 4/4$
$R_{1_2} = -3/4$
$R_{1_3} = 10/4$
$R_{1_4} = 6/4$

$$\left[\begin{array}{ccc|c} 1 & \frac{-3}{4} & \frac{5}{2} & \frac{3}{2} \\ 3 & -2 & 7 & 3 \\ 2 & -1 & 5 & 4 \end{array}\right]$$

- Untuk mengubah Row 2 Kolom 1 menjadi 0 maka $R_2 = R_2 - 3.R_1$

$R_{2_1} = 3 - 3.1$
$R_{2_2} = -2 - (-2).\frac{-3}{4}$
$R_{2_3} = 7 - 7.\frac{5}{2}$
$R_{3_4} = 3 - 3.\frac{3}{2}$

$$\left[\begin{array}{ccc|c} 1 & \frac{-3}{4} & \frac{5}{2} & \frac{3}{2} \\ 0 & \frac{1}{4} & -\frac{1}{2} & -\frac{3}{2} \\ 2 & -1 & 5 & 4 \end{array}\right]$$

- $R_3 = R_3 - 2R_1$

$R_{3_1} = 2 - 2.1$
$R_{3_2} = -1 - 2.\left(\frac{-3}{4}\right)$
$R_{3_3} = 5 - 2.\left(\frac{5}{2}\right)$
$R_{3_4} = 4 - 2.\left(\frac{3}{2}\right)$

$$\left[\begin{array}{ccc|c} 1 & \frac{-3}{4} & \frac{5}{2} & \frac{3}{2} \\ 0 & \frac{1}{4} & -\frac{1}{2} & -\frac{3}{2} \\ 0 & \frac{1}{2} & 0 & 1 \end{array}\right]$$

- $R_2 = 4R_2$

$R_{2_1} = 4.0$
$R_{2_2} = 4.\frac{1}{4}$
$R_{2_3} = 4.\left(-\frac{1}{2}\right)$
$R_{2_4} = 4.\left(-\frac{3}{2}\right)$

$$\left[\begin{array}{ccc|c} 1 & \frac{-3}{4} & \frac{5}{2} & \frac{3}{2} \\ 0 & 1 & -2 & -6 \\ 0 & \frac{1}{2} & 0 & 1 \end{array}\right]$$

- $R_1 = R_1 + 3R_2$

$$\left[\begin{array}{ccc|c} 1 & 0 & 1 & 4 \\ 0 & 1 & -2 & -3 \\ 0 & \frac{1}{2} & 0 & -6 \\ & & & 1 \end{array}\right]$$

- $R_3 = R_3 - \frac{R_2}{2}$

$$\left[\begin{array}{ccc|c} 1 & 0 & 1 & -3 \\ 0 & 1 & -2 & -6 \\ 0 & 0 & 1 & 4 \end{array}\right]$$

- $R_1 = R_1 - R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -7 \\ 0 & 1 & -2 & -6 \\ 0 & 0 & 1 & 4 \end{array}\right]$$

- $R_2 = R_2 + 2R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -7 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 4 \end{array}\right]$$

Jadi Penyelesaian matix diatas dengan gauss jordan adalah $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -7 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 4 \end{array}\right]$ dengan $x = -7$, $y = 2$ dan $z = 4$.

(4). Jawaban ada di foto excel berikut

Dengan metode bagi dua, tentukan akar dari f(x)=ex-5x didalam selang [0,1] es=0.00001

Iterasi	a-b	a	b	c	f(a)	fc	f(a).f(c)	Status
1	1,000000000000	0	1	0,5	-8	-7,875	63	FALSE
2	0,500000000000	0,5	1	0,75	-7,875	-7,578125	59,67773438	FALSE
3	0,250000000000	0,75	1	0,875	-7,578125	-7,330078125	55,54824829	FALSE
4	0,125000000000	0,875	1	0,9375	-7,330078125	-7,176025391	52,60082674	FALSE
5	0,062500000000	0,9375	1	0,96875	-7,176025391	-7,09085083	50,8841256	FALSE
6	0,031250000000	0,96875	1	0,984375	-7,09085083	-7,046146393	49,963173	FALSE
7	0,015625000000	0,984375	1	0,9921875	-7,046146393	-7,023254871	49,48688198	FALSE
8	0,007812500000	0,9921875	1	0,99609375	-7,023254871	-7,011673033	49,24476679	FALSE
9	0,003906250000	0,99609375	1	0,998046875	-7,011673033	-7,005847938	49,12271506	FALSE
10	0,001953125000	0,998046875	1	0,999023438	-7,005847938	-7,002926827	49,06144048	FALSE
11	0,000976562500	0,999023438	1	0,999511719	-7,002926827	-7,001464129	49,03074098	FALSE
12	0,000488281250	0,999511719	1	0,999755859	-7,001464129	-7,000732243	49,01537567	FALSE
13	0,000244140625	0,999755859	1	0,99987793	-7,000732243	-7,000366166	49,00768913	FALSE
14	0,000122070313	0,99987793	1	0,999938965	-7,000366166	-7,000183094	49,00384489	FALSE
15	0,000061035156	0,999938965	1	0,999969482	-7,000183094	-7,00009155	49,00192253	FALSE
16	0,000030517578	0,999969482	1	0,999984741	-7,00009155	-7,000045776	49,00096128	FALSE
17	0,000015258789	0,999984741	1	0,999992371	-7,000045776	-7,000022888	49,00048065	FALSE
18	**0,000007629395**	**0,999992371**	**1**	**0,999996185**	**-7,000022888**	**-7,000011444**	**49,00024032**	**TRUE**
19	0,000003814697	0,999996185	1	0,999998093	-7,000011444	-7,000005722	49,00012016	TRUE
20	0,000001907349	0,999998093	1	0,999999046	-7,000005722	-7,000002861	49,00006008	TRUE
21	0,000000953674	0,999999046	1	0,999999523	-7,000002861	-7,000001431	49,00003004	TRUE

1. Pilih a, b sehingga f(a),f(b)<0
2. Tentukan nilai c sebagai titik tengah a,b {c=(a+b)/2)}
3. Bila f(a).fc <0 maka b:=c, lanjutkan ke langkah 4
bila f(a).f(c) >0 maka a:=c, lanjutkan ke langkah 4
bila f(a).fc = 0, maka akar persamaan adalah c , hitungan selesai
4. Jika b-a <= epsilon, maka akar persamaan adalah c. Jika tidak ulangi langkah 2