

Pertemuan 6 KOMPUTASI NUMERIK

SISTEM PERSAMAAN LINIER

Metoda Substitusi Balik

Sistem persamaan liniernya menjadi

$$\begin{aligned}a_{11}x_1 + a_{12}x_2 + a_{13}x_3 &= a_{14} \\a_{22}x_2 + a_{23}x_3 &= a_{24} \\a_{33}x_3 &= a_{34}\end{aligned}$$

dengan metode substitusi balik

$$\begin{aligned}a_{33}x_3 &= a_{34} \\x_3 &= a_{34}/a_{33} \\a_{22}x_2 + a_{23}x_3 &= a_{24} \\x_2 &= (a_{24} - a_{23}x_3)/a_{22} \\a_{11}x_1 + a_{12}x_2 + a_{13}x_3 &= a_{14} \\x_1 &= (a_{14} - (a_{12}x_2 + a_{13}x_3))/a_{11}\end{aligned}$$

Hasil pada contoh modul 5 adalah

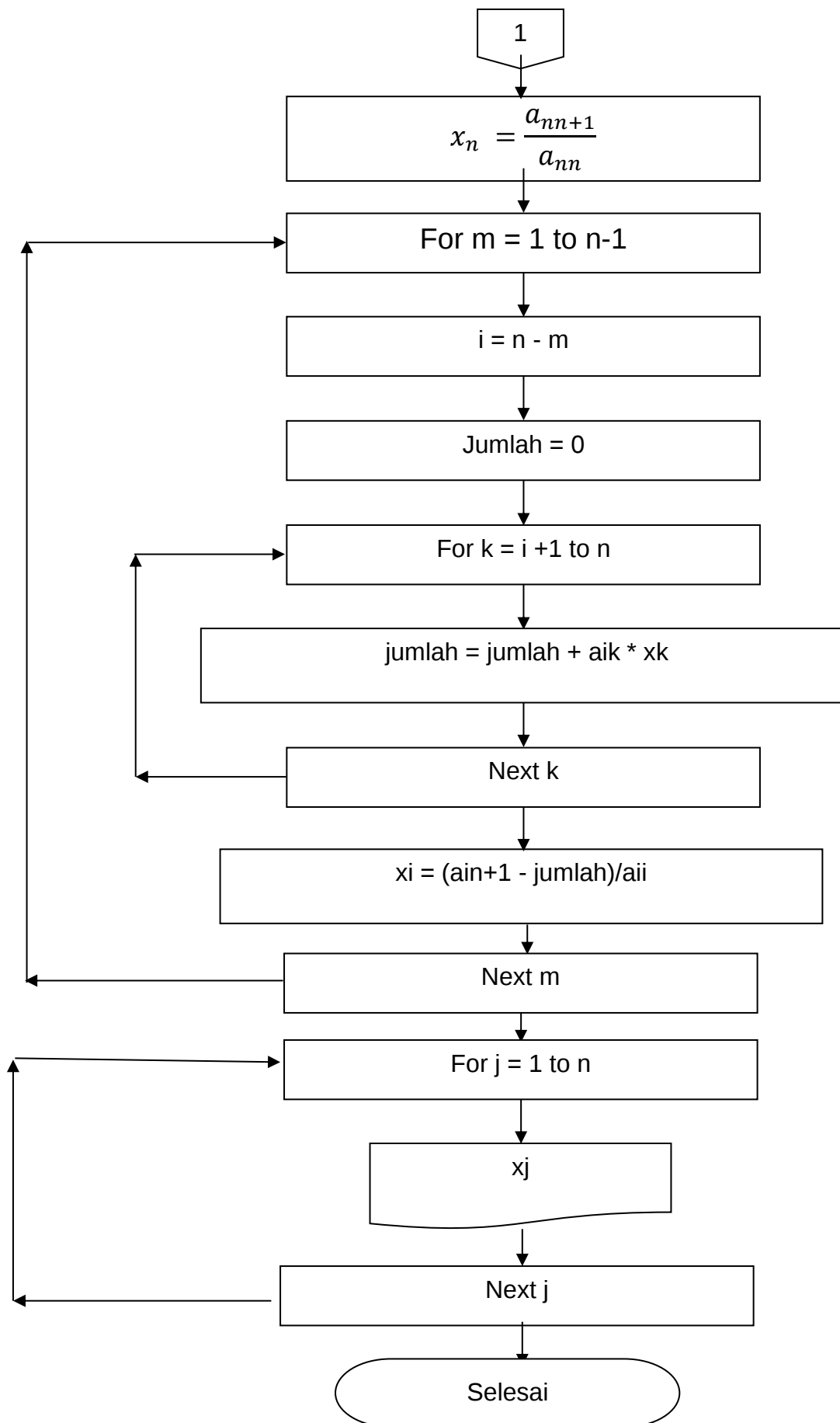
$$\begin{bmatrix} 2 & -1 & 1 & 2 \\ 0 & \frac{5}{2} & \frac{1}{2} & 3 \\ 0 & 0 & \frac{1}{5} & \frac{1}{5} \end{bmatrix}$$

Dalam bentuk perkalian matriks

$$\begin{bmatrix} 2 & -1 & 1 \\ 0 & \frac{5}{2} & \frac{1}{2} \\ 0 & 0 & \frac{1}{5} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_n \end{bmatrix} = \begin{bmatrix} 2 \\ 3 \\ \frac{1}{5} \end{bmatrix}$$

Sistem persamaan liniernya menjadi

$$\begin{aligned}2x_1 - x_2 + x_3 &= 2 \\ \frac{5}{2}x_2 + \frac{1}{2}x_3 &= 3 \\ \frac{1}{5}x_3 &= \frac{1}{5}\end{aligned}$$



$$\begin{bmatrix} 2 & -1 & 1 & 2 \\ 0 & \frac{5}{2} & \frac{1}{2} & 3 \\ 0 & 0 & \frac{1}{5} & \frac{1}{5} \end{bmatrix}$$

$$x_n = \frac{a_{nn+1}}{a_{nn}}$$

$$n = 3 \rightarrow x_3 = \frac{a_{34}}{a_{33}} = \frac{\frac{1}{5}}{\frac{1}{2}} = 1$$

m=1 to n-1(2)	i=n-m =3-m	jumlah	k=i+1 to n (3)	jumlah = jumlah + a _{ik} * x _k	x _i = (a _{in+1} - jumlah)/a _{ii} = (a _{i4} - jumlah)/a _{ii}
1	2	0	3	Jumlah =0+a ₂₃ *x ₃ Jumlah = $\frac{1}{2} * 1 = \frac{1}{2}$	X ₂ = (a ₂₄ - jumlah)/a ₂₂ = $(3-\frac{1}{2})/\frac{5}{2}=(\frac{6-1}{2})/\frac{5}{2} = 1$
2	1	0	2	Jumlah =0+a ₁₂ *x ₂ Jumlah = $-1 * 1 = -1$	
			3	Jumlah =-1+a ₁₃ *x ₃ Jumlah = $-1 + 1 * 1$ = 0	X ₁ = (a ₁₄ - jumlah)/a ₁₁ = $(2-0)/2 = 1$

Hasilnya

$$\begin{bmatrix} x_1 \\ x_2 \\ x_n \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

