Tutorial - I

Ex 2 :-

$$G_2 = \frac{1}{s^6 + 7s^5 + 2s^4 + 9s^3 + 10s^2 + 12s + 15}$$

s^{6}	1	2	10	15
s^5	7	9	12	0
s^4	$-\frac{\begin{vmatrix} 1 & 2 \\ 7 & 9 \end{vmatrix}}{7} = \frac{5}{7}$	$-\frac{\begin{vmatrix} 1 & 10 \\ 7 & 12 \end{vmatrix}}{7} = \frac{58}{7}$	$-\frac{\begin{vmatrix} 1 & 15 \\ 7 & 0 \end{vmatrix}}{7} = 15$	0
s^3	$-\frac{\begin{vmatrix} 7 & 9 \\ \frac{5}{7} & \frac{58}{7} \end{vmatrix}}{\frac{5}{7}} = -72.2$	$-\frac{\begin{vmatrix} 7 & 12 \\ \frac{5}{7} & 15 \end{vmatrix}}{\frac{5}{7}} = -135$	0	0
s^2	$+\frac{\begin{vmatrix} \frac{5}{7} & \frac{58}{7} \\ -72.2 & -135 \end{vmatrix}}{+72.2} = 6.95$	$+\frac{\begin{vmatrix} \frac{5}{7} & 15 \\ -72.2 & 0 \end{vmatrix}}{+72.2} = 15$	0	0
s^1	$-\frac{\begin{vmatrix} -72.2 & -135 \\ 6.95 & 15 \end{vmatrix}}{6.95} = 20.8273$	0	0	0
s^0	$-\frac{\begin{vmatrix} 6.95 & 15 \\ 20.8273 & 0 \end{vmatrix}}{20.8273} = 15$	0	0	0

Without roughwork:-

s^6	1	2	10	15
s^5	7	9	12	0
s^4	0.7143	8.2857	15	0
s^3	-72.2	-135	0	0
s^2	6.95	15	0	0
s^1	20.8273	0	0	0
s^0	15	0	0	0

Sign changes:-

s^6 +
s^5 +
s^4 +
s^3 −
s^2 +
s^1 +
s^0 +

2 sign changes
$\Rightarrow$ 2 poles on R HP

Unstable.