MACM 316 Lecture 6

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1 Partial Pivoting

Parital pivoting is the simplest technique to avoid generating massive round-off errors in the Gaussian Elimination algorithm.

The idea is to find the largest element beneath the pivot and swap its row with the pivot row.

Parital pivoting is sufficient for most linear systems. However, it can be inadequate for certain problems.

1.1 Example

Consider the linear system:

$E_1 : 30.00x_1 + 591400x_2 = 491700$

$E_2 : 5.291x_1 - 6.130x_2 = 46.78$

No row exchanges are carried out during partial pivoting.

Now, the multiplier is $m_{21} = \frac{5.291}{30.000} = 0.1764$ and $(E_2 - m_{21}E_1 \to E_1)$ gives the system

$30.00x_1 + 591400x_2 \approx 591700$

$-104300x_1 \approx -104400$