

Solve the following equation using Gauss elimination.

$$x_2 + x_3 = 3$$

$$2x_1 + x_2 = 8$$

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

Augmented matrix

$$\begin{array}{cccc} 0 & 1 & 1 & 3 \\ 2 & 1 & 0 & 8 \\ 1 & 2 & 1 & 8 \end{array}$$

First column

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Partial pivoting

$$\begin{array}{cccc} 2 & 1 & 0 & 8 \\ 0 & 1 & 1 & 3 \\ 1 & 2 & 1 & 8 \end{array}$$

elimination

$$\begin{array}{cccc} 2.0000 & 1.0000 & 0 & 8.0000 \\ 0 & 1.0000 & 1.0000 & 3.0000 \\ 0 & 1.5000 & 1.0000 & 4.0000 \end{array}$$

Second Column

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partial pivoting

$$\begin{array}{cccc} 2.0000 & 1.0000 & 0 & 8.0000 \\ 0 & 1.5000 & 1.0000 & 4.0000 \\ 0 & 1.0000 & 1.0000 & 3.0000 \end{array}$$

elimination

$$\begin{array}{cccc} 2.0000 & 1.0000 & 0 & 8.0000 \\ 0 & 1.5000 & 1.0000 & 4.0000 \\ 0 & 0 & 0.3333 & 0.3333 \end{array}$$

Back Substitution

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Solution for x_1 , x_2 , x_3 :

3.0000

2.0000

1.0000