3.(a) $AX = B$

$$\Leftrightarrow A\cdot\begin{pmatrix} x_{11} \\ \vdots \\ x_{n1}\end{pmatrix} = \begin{pmatrix} b_{11} \\ \\ b_{n1}\end{pmatrix} \text{ e } A\begin{pmatrix} x_{12} \\ \vdots \\ x_{n2}\end{pmatrix} = \begin{pmatrix} b_{12} \\ \vdots \\ b_{n2}\end{pmatrix}, \ldots$$

$$\ldots A\cdot\begin{pmatrix} x_{1m} \\ \\ x_{nm}\end{pmatrix} = \begin{pmatrix} b_{1m} \\ \\ b_{nm}\end{pmatrix}$$

(b) Resolver um sistema linear da forma $Ax = b$ com $A \in \mathbb{R}^{n\times n}$, $b \in \mathbb{R}^n$ custa aproximadamente

$$\underbrace{\frac{2}{3}n^3}_{\text{escalonar matriz aument.}} + \underbrace{n^2}_{\text{resolver sistema triangular sup.}} \text{ flops utilizando El. Gauss.}$$

$$\underbrace{\frac{2}{3}n^3}_{\text{calcular L e U}} + \underbrace{2n^2}_{\text{resolver 2 sistemas triangulares}} \text{ flops utilizando LU}$$

Então, resolver $AX = B$ com $A \in \mathbb{R}^{n\times n}$, $B \in \mathbb{R}^{n\times m}$

~~co~~ custa $\approx m\left(\frac{2}{3}n^3 + n^2\right)$ flops usando El. Gauss.

$= 1701$ para $m = 3$ e $n = 9$

$\frac{2}{3}n^3 + 2mn^2$ com LU $= 972$ flops para $m = 3, n = 9$

porque somente necissita 1 vez calculo de L e U

Escolha LU