M/CS 375 HW 11

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Problem 8

If a system of 3000 equations in 3000 unknowns can be solved by Gaussian elimination in 5 seconds on a given compouter, how many back substitutions of the same size can be done per second?

$$\begin{aligned}
\frac{x^2}{2 \cdot 3000^3/3} &= \frac{1}{5} \\
\frac{3x^2}{2 \cdot 3000^3} &= \frac{1}{5} \\
3x^2 &= \frac{2 \cdot 3000^3}{5} \\
x^2 &= \frac{2 \cdot 3000^3}{5 \cdot 3} \\
x &= 60000 \text{ / second}
\end{aligned}$$