## Exercises on solving $A \mathbf{x}=\mathbf{b}$ and row reduced form $R$

Problem 8.1: (3.4 \#13.(a,b,d) Introduction to Linear Algebra: Strang) Explain why these are all false:
a) The complete solution is any linear combination of $\mathbf{x}_{p}$ and $\mathbf{x}_{n}$.
b) The system $A \mathbf{x}=\mathbf{b}$ has at most one particular solution.
c) If $A$ is invertible there is no solution $\mathbf{x}_{n}$ in the nullspace.

Problem 8.2: (3.4 \#28.) Let

$$
U=\left[\begin{array}{lll}
1 & 2 & 3 \\
0 & 0 & 4
\end{array}\right] \text { and } \mathbf{c}=\left[\begin{array}{l}
5 \\
8
\end{array}\right]
$$

Use Gauss-Jordan elimination to reduce the matrices $\left[\begin{array}{ll}U & 0\end{array}\right]$ and $\left[\begin{array}{ll}U & \mathbf{c}\end{array}\right]$ to $\left[\begin{array}{ll}R & 0\end{array}\right]$ and $\left[\begin{array}{ll}R & \mathbf{d}\end{array}\right]$. Solve $R \mathbf{x}=\mathbf{0}$ and $R \mathbf{x}=\mathbf{d}$.

Check your work by plugging your values into the equations $U \mathbf{x}=\mathbf{0}$ and $U \mathbf{x}=\mathbf{c}$.

Problem 8.3: (3.4 \#36.) Suppose $A \mathbf{x}=\mathbf{b}$ and $C \mathbf{x}=\mathbf{b}$ have the same (complete) solutions for every $\mathbf{b}$. Is it true that $A=C$ ?

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