HOMEWORK #1 SOLUTION

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Problem: Prove that the system of m equations in n variables $Ax = b$ is equivalent to the system $Ax \leq b$ augmented by only *one* additional linear inequality – that is, a total of only m+1 inequalities. The *characteristic polynomial* $\chi(\lambda)$ of the 3×3 matrix

$$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix}$$

is given by the formula

$$\chi(\lambda) = \begin{vmatrix} \lambda - a & -b & -c \\ -d & \lambda - e & -f \\ -g & -h & \lambda - i \end{vmatrix} \tag{4.1}$$

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