

HOMEWORK #1 SOLUTION

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1. EXERCISE 1.1 CONVERT TO STANDARD FORM
2. EXERCISE 1.2 WEAK DUALITY EXAMPLE
3. EXERCISE 1.3 CONVERT TO \leq FORM
4. EXERCISE 1.4 $m + 1$ INEQUALITIES

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

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

5. EXERCISE 1.5 WEAK DUALITY FOR ANOTHER FORM
6. EXERCISE 1.6 WEAK DUALITY FOR A COMPLICATED FORM
7. EXERCISE 1.7 WEAK DUALITY FOR A COMPLICATED FORM — WITH MATLAB