The University of Texas at San Antonio
EE 5243
Introduction to Cyber-Physical Systems

QUIZ \# 5
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Find a solution (or solutions) that satisfies the KKT conditions for the following optimization problem:

$$
\begin{array}{ll}
\underset{x}{\operatorname{minimize}} & f(x)=2 x_{1}+x_{2} \\
\text { subject to } & h(x)=x_{1}+x_{2}-1=0 \\
& g(x)=x_{1}+2 x_{2}-2 \leq 0 \tag{3}
\end{array}
$$

The KKT conditions are given by:

1. $\nabla_{x} \mathcal{L}\left(x^{*}, \lambda^{*}, \mu^{*}\right)=\nabla_{x} f(x)+\lambda^{*} \nabla_{x} h\left(x^{*}\right)+\mu^{*} \nabla_{x} g\left(x^{*}\right)=0$
2. $\mu^{*} \geq 0$
3. $\mu^{*} g\left(x^{*}\right)=0$
4. $g\left(x^{*}\right) \leq 0$
5. $h\left(x^{*}\right)=0$
