Name (Last, First)

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1. (8pts) Find a general solution to the system

$$\mathbf{x}'(t) = \begin{bmatrix} 2 & -2 & -1 \\ 0 & 0 & 1 \\ 0 & -1 & 0 \end{bmatrix} \mathbf{x}(t) + \mathbf{f}(t), \quad \text{where } \mathbf{f}(t) = \begin{bmatrix} 0 \\ 0 \\ -1 \end{bmatrix}.$$

YOU HAVE A BIT OF SPACE ON THE BACK!

HERE

2. (2pts) Let $\mathbf{x}_1(t) = \begin{bmatrix} t \\ t^2 - 1 \end{bmatrix}$ and $\mathbf{x}_2(t) = \begin{bmatrix} 1 \\ t \end{bmatrix}$. Find a 2×2 matrix $\mathbf{A}(t)$ of continuous functions such that $\mathbf{x}_1(t)$ and $\mathbf{x}_2(t)$ are solutions for

$$\mathbf{x}'(t) = A(t)\mathbf{x}(t).$$