

Name (Last, First)

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1. (7pts) Find a general solution to the system

$$\mathbf{x}'(t) = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix} \mathbf{x}(t) + \mathbf{f}(t), \quad \text{where } \mathbf{f}(t) = \begin{bmatrix} 2e^t \\ 2e^t \end{bmatrix}.$$

YOU HAVE A BIT OF SPACE ON THE BACK!

HERE

2. (3pts) Let  $\mathbf{x}_1(t) = \begin{bmatrix} t \\ t \end{bmatrix}$  and  $\mathbf{x}_2(t) = \begin{bmatrix} t^2 \\ t^2 \end{bmatrix}$ .

a. Compute the Wronskian of  $\mathbf{x}_1(t)$  and  $\mathbf{x}_2(t)$ .

b. Explain why there can never exist a  $2 \times 2$  matrix  $\mathbf{A}(t)$  of continuous functions such that  $\mathbf{x}_1(t)$  and  $\mathbf{x}_2(t)$  are solutions for

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