

MATH 54 SPRING 2019: DISCUSSION 109/112 QUIZ#10

GSI: CHRISTOPHER EUR, DATE: 4/30/2019

STUDENT NAME: _____

For both of the problems, let A be a matrix

$$\begin{bmatrix} 2 & 1 \\ -3 & -2 \end{bmatrix}.$$

Problem 1. Find the fundamental matrix $X(t)$ of $\mathbf{x}'(t) = A\mathbf{x}(t)$. (That is, a matrix $X(t)$ whose columns form a basis for the solution space of $\mathbf{x}'(t) = A\mathbf{x}(t)$). And compute the inverse $X^{-1}(t)$.

Problem 2. Now, compute the general solution to the inhomogeneous equation $\mathbf{x}'(t) = A\mathbf{x}(t) + \mathbf{f}(t)$, where $\mathbf{f}(t) = \begin{bmatrix} 2e^t \\ 4e^t \end{bmatrix}$.