

Quiz 6

1. (5 points) Consider the vector functions $\begin{pmatrix} 1 \\ t \\ 0 \end{pmatrix}$, $\begin{pmatrix} t \\ 0 \\ 1 \end{pmatrix}$, and $\begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$.
 - (a) Are these three vector functions linearly independent on $(-\infty, \infty)$?
 - (b) Are these three vector functions solutions to the same homogenous linear system?
2. (5 points) For $\vec{x}'(t) = \begin{pmatrix} 1 & 2 \\ 3 & 2 \end{pmatrix} \vec{x}(t)$.
 - (a) Give the general solution to this differential equation.
 - (b) Give the solution with the initial condition $\vec{x}(0) = \begin{pmatrix} 0 \\ 5 \end{pmatrix}$.
3. (1 point) Find a fundamental matrix for $\vec{y}'(t) = \begin{pmatrix} 0 & 1 \\ -1 & 2 \end{pmatrix} \vec{y}(t)$. (This corresponds to $y'' - 2y' + y = 0$, which you may use if you wish.)