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MATH 3306 Quiz 7.5

Consider the following system of differential equations:

$$x_1' = 5x_1 - x_2$$
 and  $x_2' = 3x_1 + x_2$ 

- (1) Write the system of equations in a vector/matrix form ( $\vec{x}' = A\vec{x}$ , what is A?):
- (2) Find the eigenvalues and corresponding eigenvectors (Mathematica) for the coefficient matrix and write the general solution for this system of equations.

(3) Find the particular solution if the initial conditions are:

$$\vec{x}(0) = \begin{pmatrix} 2\\ -1 \end{pmatrix}$$