M 327J - Differential Equations with Linear Algebra

October 17, 2022

Quiz 5

1. **[7 points]** Let V be the vector space containing all solutions to the differential equation

$$y'' + 2y' + 2y = 0.$$

(a) Find a basis of V.

(b) Define $D : V \to V$ as the differentiation operator, i.e. for $f \in V$ we define

$$(Df)(t) = f'(t).$$

Since D is a linear transformation we know we can write it as a matrix. Find this matrix in terms of the basis found in part (a).

2. **[3 points]** Find the inverse of the matrix

$$A = \begin{pmatrix} 1 & -1 & 1 \\ -1 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix}$$