Some Examples

Ex: Any collection $0, v_1, v_2, ..., v_k$ that has the zero vector as a member is linearly dependent, i.e. here is an example of a non-trivial solution for the c_i's:

$$5 \times \underbrace{0}_{\text{zero vector}} + \underbrace{0}_{\text{scalar}} \times v_1 + \underbrace{0}_{\text{scalar}} \times v_2 + \cdots + \underbrace{0}_{\text{scalar}} \times v_k = \underbrace{0}_{\text{zero vector}}$$

Ex: The columns of the identity matrix are linearly independent:

$$0 = c_1 e_1 + c_2 e_2 + \cdots + c_n e_n = \begin{bmatrix} e_1 & \cdots & e_k \end{bmatrix} c = Ic = c$$

Ex: The matrix A from the start of this Part:

$$c_1 \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} + c_2 \begin{bmatrix} 3 \\ 6 \\ -3 \end{bmatrix} + c_3 \begin{bmatrix} 3 \\ 9 \\ 3 \end{bmatrix} + c_4 \begin{bmatrix} 2 \\ 7 \\ 4 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$