

Worksheet 30 (April 26)

DIS 119/120 GSI Xiaohan Yan

1 Problems

Example 1. True or false.

- () A column of a fundamental solution matrix of the ODE system $\mathbf{x}' = A\mathbf{x}$ is a solution.
- () Any two fundamental solution matrices of the ODE system $\mathbf{x}' = A\mathbf{x}$ differ by a series of row reductions.
- () The initial value problem $y'''(t) - 2y''(t) + y'(t) + y(t) = 0, y(0) = 0, y'(0) = 1$ has a unique solution.

Example 2. Consider the 1st order homogeneous linear system of ODE

$$\mathbf{x}'(t) = \begin{pmatrix} 0 & 1 & 1 \\ -1 & 0 & 1 \\ -1 & -1 & 0 \end{pmatrix} \mathbf{x}(t).$$

Prove that the norm of any solution $\mathbf{x}(t)$ is constant in t .