

MATH 411, Spring 2001

Homework 4

Due: 5, April, 2001

R. Redheffer, *Differential Equations*:

[13.1] 3(i,m);

[13.2] 9;

[15.3] 6(b) or 6(a) (the one which you prefer most);

*) Construct fundamental matrix for each problem and find the solution satisfying specified initial data

$$\text{a) } \begin{cases} \frac{dx}{dt} = 2x + y, \\ \frac{dy}{dt} = x - 3y, \end{cases} \quad x(0) = y(0) = 0,$$

$$\text{b) } \begin{cases} \frac{dx}{dt} = 2x - y + z, \\ \frac{dy}{dt} = x + z, \\ \frac{dz}{dt} = y - 2z - 3x, \end{cases} \quad x(0) = 0, \quad y(0) = 0, \quad z(0) = 1.$$

**) Find the general solution for the inhomogeneous linear system by method of variation of parameter.

$$\text{a) } \begin{cases} \frac{dx}{dt} + 2x - y = -e^{2t}, \\ \frac{dy}{dt} + 3x - 2y = 6e^{2t}, \end{cases}$$

$$\text{b) } \begin{cases} \frac{dx}{dt} = y, \\ \frac{dy}{dt} = -x + \frac{1}{\cos t}, \end{cases}$$

All problems are estimated by 20 points.