2E2 Tutorial Sheet 11 Second Term[1]

16 January 2004

1. (3) Find the general solutions for the system

$$\frac{dy_1}{dt} = -2y_1 + y_2 \tag{1}$$
$$\frac{dy_2}{dt} = y_1 - 2y_2 \tag{2}$$

Sketch the phase diagram and and describe the node.

2. (3) Find the solution of

$$\frac{dy_1}{dt} = -9y_2 \tag{3}$$
$$\frac{dy_2}{dt} = y_1 \tag{4}$$

by considering $y_1(0) = r$ and $y_2(0) = 0$, draw the phase diagram.

3. (2) Find the solution of

$$\frac{dy_1}{dt} = -y_1 - 2y_2 \tag{5}$$
$$\frac{dy_2}{dt} = 2y_1 - y_2 \tag{6}$$

for initial conditions $y_1(0) = r$ and $y_2(0) = 0$ write this in real form.

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