

## MATH 416 — Problem set #1

Due, Monday, September 30, 2002

**Problem 1** These problems are from the lecture notes “Introduction to Ordinary Differential Equations”, pages 127–134.

- 4.2
- 4.3
- 4.4
- 4.8
- 4.17

**Problem 2** Consider the nonautonomous system of ordinary differential equations

$$u_{ttt} = u_{tt} + v_t, v_{tt} = u^2 + \sin(v) + e^t u_t v_t$$

with initial data

$$u(0) = u_t(0) = u_{tt}(0) = v_t(0) = 0, \quad v(0) = 2.$$

Reduce this initial value problem to a first-order system in the standard form.