

Problem 29

The position of a certain spring-mass system satisfies the initial value problem

$$u'' + \frac{1}{4}u' + 2u = 0, \quad u(0) = 0, \quad u'(0) = 2.$$

- (a) Find the solution of this initial value problem.
- (b) Plot u versus t and u' versus t on the same axes.
- (c) Plot u' versus u in the phase plane (see Problem 28). Identify several corresponding points on the curves in parts (b) and (c). What is the direction of motion on the phase plot as t increases?