

Exercise 4

Please determine the steady state and stability properties of each of the following systems of equations and then draw an appropriate phase diagram. If the system is saddle-path stable, sketch a possible stable path.

(a) $\frac{dx}{dt} = x + y - 1, \frac{dy}{dt} = x + 2y - 1$

(b) $\frac{dx}{dt} = x - 2y - 1, \frac{dy}{dt} = x + 2y - 1$

(c) $\frac{dx}{dt} = -x + 2y - 2, \frac{dy}{dt} = x - 5y + 4$

(d) $\frac{dx}{dt} = -2x + 4y - 2, \frac{dy}{dt} = -2x - 3y + 4$

(e) $\frac{dx}{dt} = x - 2y - 1, \frac{dy}{dt} = -x - 5y + 4$

(f) $\frac{dx}{dt} = -x - 2y - 1, \frac{dy}{dt} = x + 3y + 4$