

- (1) (7 points) Given the following autonomous differential equation

$$\frac{dx}{dt} = x^2(x^2 - 1).$$

Find all critical points. Draw the phase diagram and indicate whether each critical point is stable or unstable.

- (2) (3 points) Given the following initial value problem

$$\frac{dy}{dx} = x \cos(y), \quad y(0) = 1.$$

Write the iterative formula of Euler's method and the initial point. (You can denote the step size by  $h$ .)