

**Exercise: normal form of tangent bifurcation**

Analyze this dynamical system for its attractors, repellers, and their dependence on the parameter,  $\alpha$ :

$$\dot{x} = f(x) = \alpha - x^2$$

1. Determine fixed points,  $x_0$ , as solutions of  $\dot{x} = 0$
2. Determine the stability by examining the sign of  $\frac{df}{dx}(x_0)$
3. Draw the dynamics for different values of  $\alpha$  and make a bifurcation diagram by sketching the attractors and repellers as a function of  $\alpha$ .