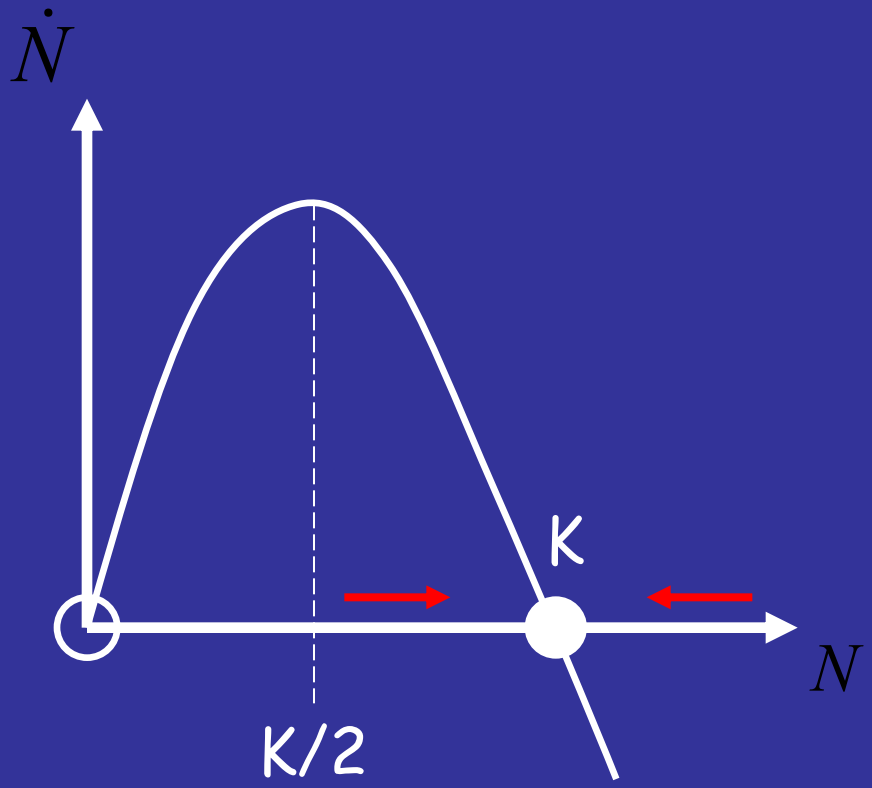
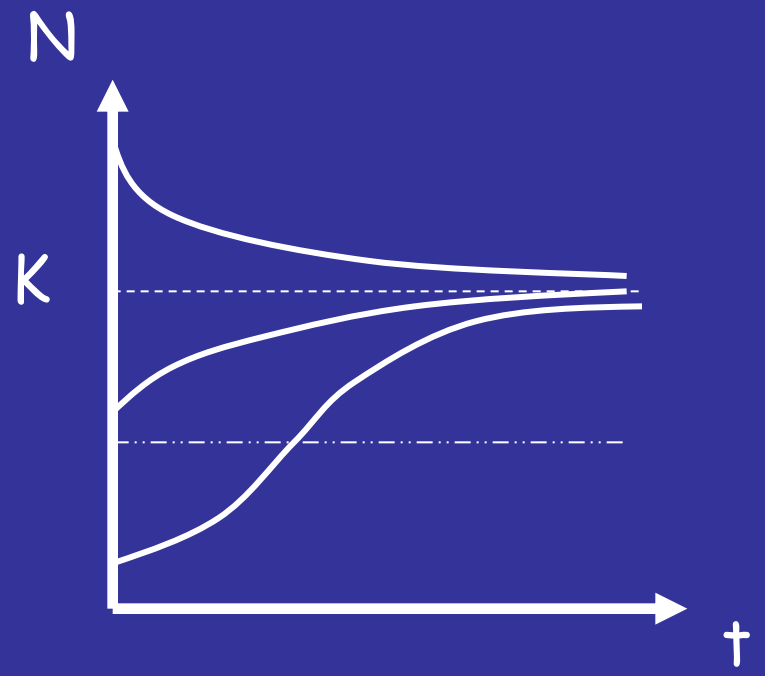
Logistic Differential Equation

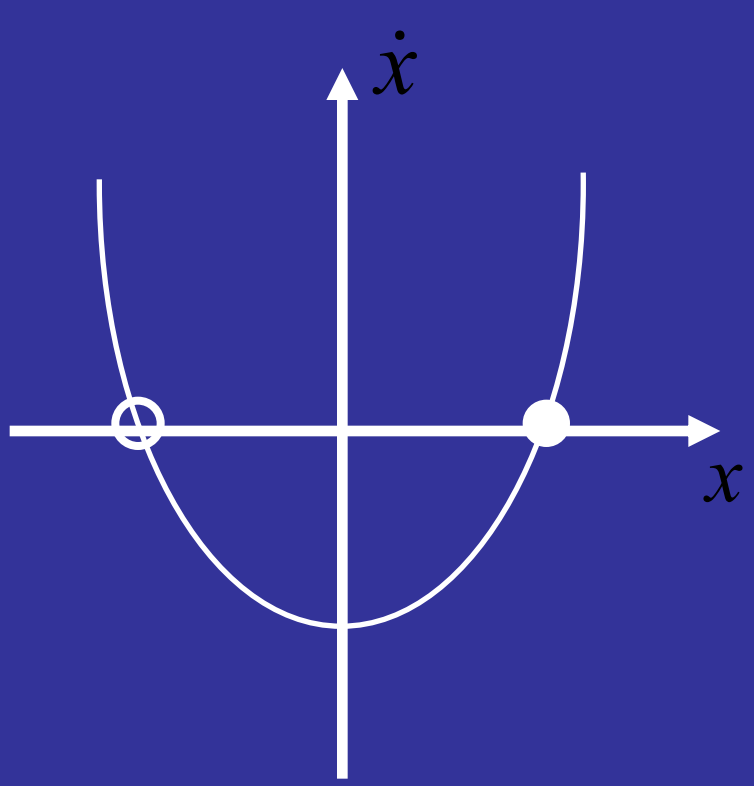
$$\dot{N} = rN\left(1 - \frac{N}{K}\right)$$

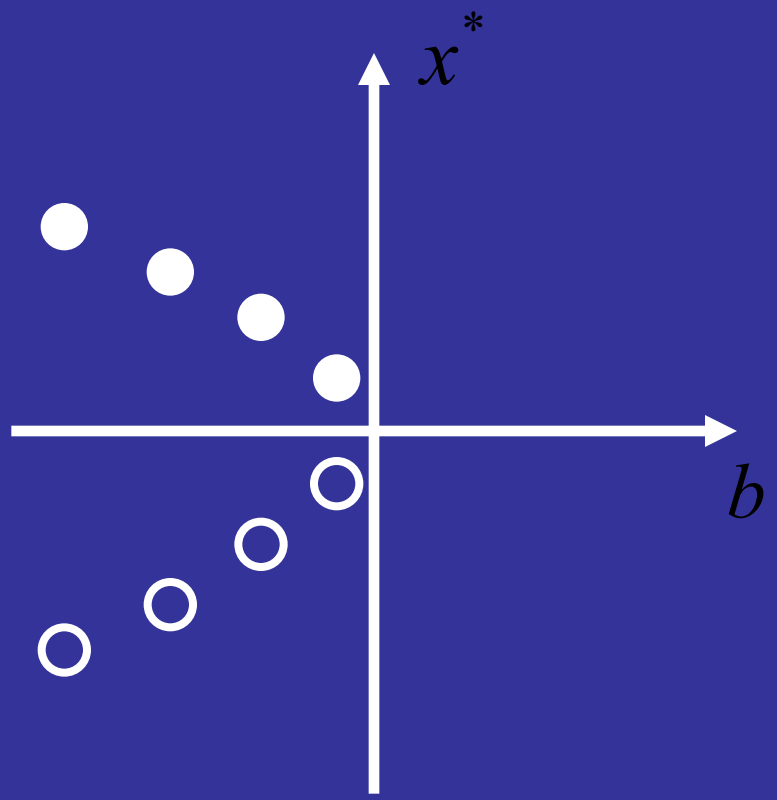




Saddle Node Bifurcation (1-dim)

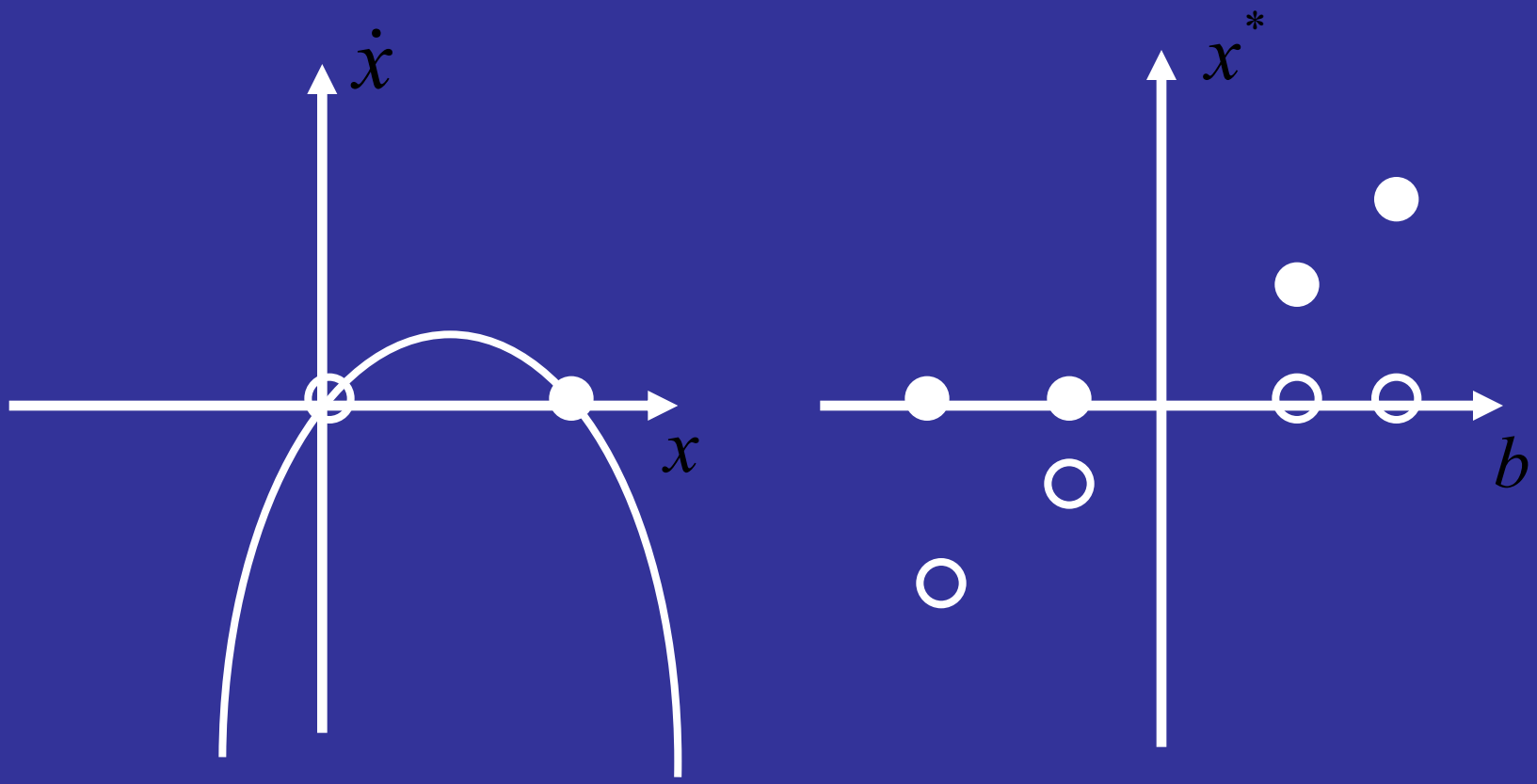
Prototypical example: $\dot{x} = b + x^2$





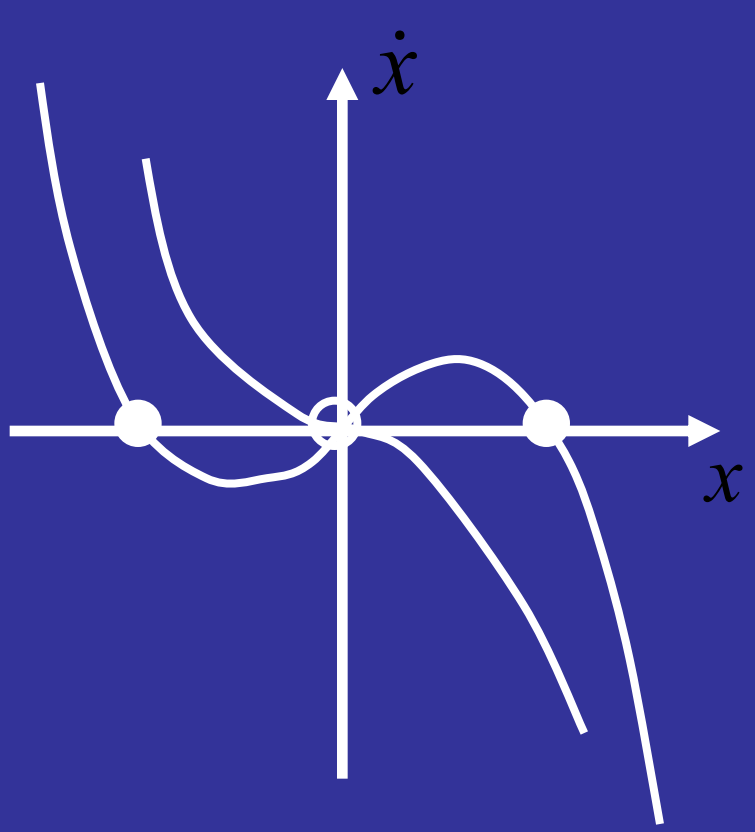
Transcritical Bifurcatoin

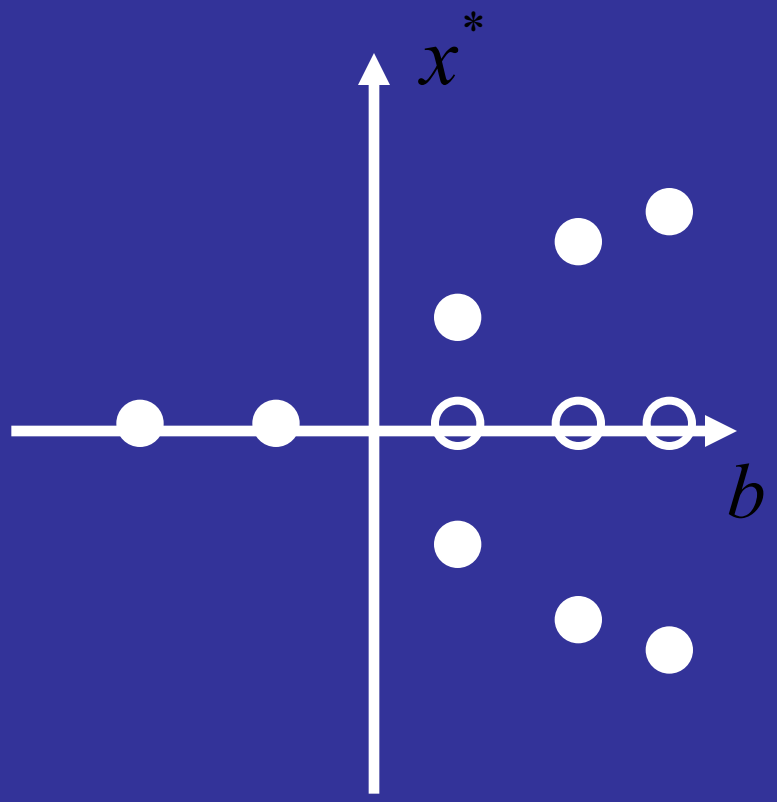
Prototypical example: $\dot{x} = bx - x^2$



Pitchfork Bifurcation

Prototypical example: $\dot{x} = bx - x^3$





Dynamics of Two Dimensional Systems

1. Find the fixed points in the phase space!
2. Linearize the system about the fixed points!
3. Determine the eigenvalues of the Jacobian.