

In the investment model, the first-order conditions of the Hamiltonian maximizing the present value of net cash flow give us

$$\dot{K}(t) = N \times I(t) = N \times C'^{-1}[q(t) - 1] \equiv f(q(t)),$$

with $f(1) = 0$ and $f' > 0$, and

$$\dot{q}(t) = rq(t) - R[K(t)].$$

1. In the diagram below, show the set of points for which $\dot{K} = 0$, $\dot{K} < 0$, and $\dot{K} > 0$.
2. Now show the points for which $\dot{q} = 0$, $\dot{q} < 0$, and $\dot{q} > 0$.
3. Draw the appropriate horizontal and vertical arrows in each quadrant defined by the $\dot{K} = 0$ and $\dot{q} = 0$ loci and describe the dynamics of the model given that q can jump instantaneously but K cannot.

