Exercise
Lotka-Volterra Predator-Prey Model

Volterra (Italian mathematician, 19th century) studied populations of fish in sea. He explained the increase in predator fish and the corresponding decrease in prey fish. Lotka was an American biologist who independently produced the same model.

$$\dot{x}_1 = ax_1 - bx_1x_2$$
$$\dot{x}_2 = -dx_2 + cx_1x_2$$

a) Find all equilibrium solutions.
b) Simulate the model in Simulink.
c) Change the initial conditions and explain the result.
d) Free exercise: Try to model effects such as fishing or new fish.

a=1, b=2, c=3, d=4