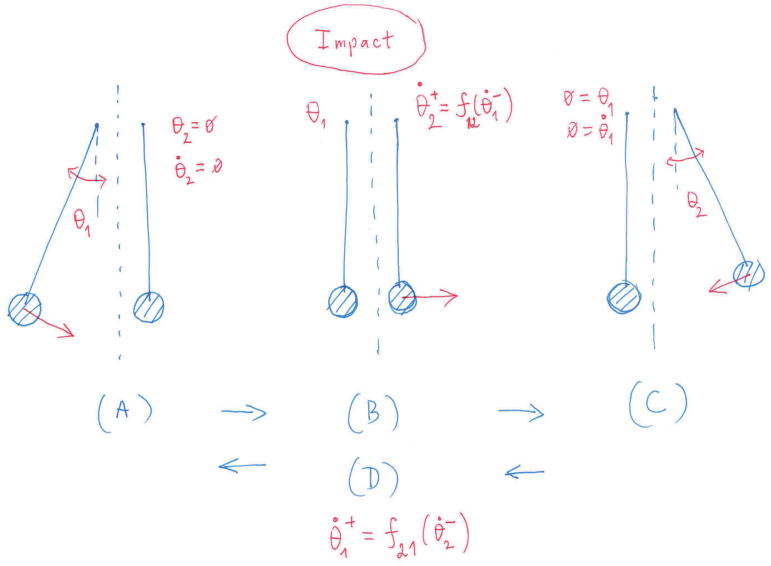
Homework 5: Task 1

Consider a hybrid mechanical system consisting of two math pendulums

$$\ddot{\theta}_1 + \omega_1^2 \theta_1 = 0, \qquad \ddot{\theta}_2 + \omega_1^2 \theta_2 = 0,$$

which behaviors are determined by the functions $f_{21}(\cdot)$, $f_{12}(\cdot)$ and the rule



Task is

- to derive the equations which describe initial conditions for hybrid cycles in the system
- to find cycles and check their orbital stability when

$$f_{21}(x) = x + \delta \cdot x(1-x), \qquad f_{12}(x) = x + \varepsilon \cdot x(1-x)$$