



**Assumption**

(A1) The ODE  $\dot{u} = f(u, v)$  is bistable in  $u$  for each fixed  $v \in I = (v^-, v^*)$ . That is,  $f(u, v) = 0$  has exactly three roots  $h^-(v) < h^0(v) < h^+(v)$  for each  $v \in I$  satisfying

$$f_u(h^\pm(v), v) < 0 \quad \text{and} \quad f_u(h^0(v), v) > 0.$$

(A2) The function

$$J(v) := \int_{h^-(v)}^{h^+(v)} f(u, v) du \quad (v \in I)$$

has an isolated zero at  $v = v^* \in I$  such that

$$J'(v^*) = \int_{h^-(v^*)}^{h^+(v^*)} f_u(u, v^*) du \neq 0.$$

(A3)  $f_u(h^\pm(v), v) < f_u(h^\pm(v^*), v)$  ( $v \in I$ ).

(A4) The conserved mass  $\xi$  satisfies the following inequality:

$$h^-(v^*) + v^* < \xi < h^+(v^*) + v^*.$$