# Our statement of the problem
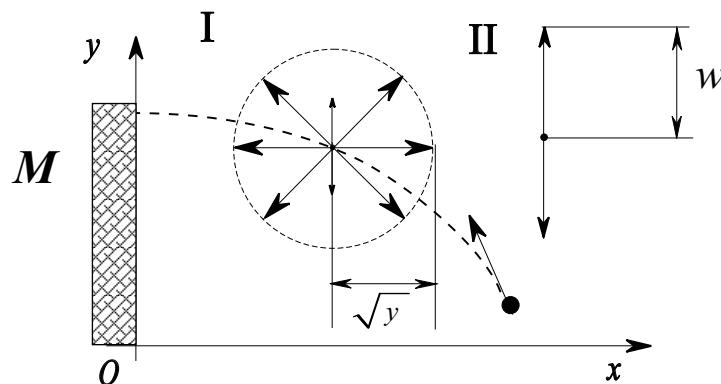
Dynamical system:

$$\dot{x} = \sqrt{y}\, u_1$$

$$\dot{y} = \sqrt{y}\, u_2 + v$$

Game space:

$$N = \{(x, y) \in \mathrm{R}^2 : x \geq 0,\, y \geq 0\}$$

Admissible controls: $\quad u = (u_1, u_2) \in P =$
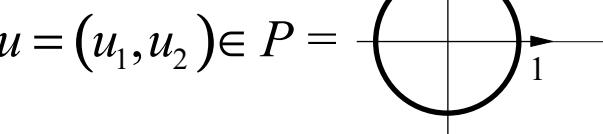
$$v \in Q = \{v \in \mathrm{R}^1 : |v| \leq w\}$$

Terminal set: $\quad M = [-d, 0] \times [0, h]$

$$\mathrm{I}: \ t_f \rightarrow \min \qquad \mathrm{II}: \ t_f \rightarrow \max$$

Isaacs-Bellman equation: $\quad \min\limits_{u \in P} \max\limits_{v \in Q} \{T_x \dot{x} + T_y \dot{y}\} = -1$

For our case: $\quad -\sqrt{y}\,\rho + w\,|T_y| + 1 = 0 \qquad \rho = \sqrt{T_x^2 + T_y^2}$