Internship
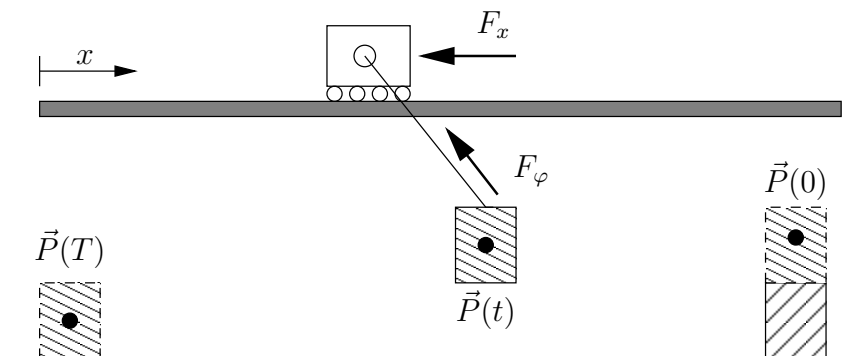
Steering of a crane with an heuristic algorithm

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The crane presented in the drawing will be controled by forces F_x and F_φ. By this steering, the point $\vec{P}(t)$ should be moved in the time interval $t \in [0, T]$ from an initial position $\vec{P}(0) = \vec{0}$ to an endpoint $\vec{P}(T) = \vec{x}_{\text{end}}$.
(All velocities at time moments $t = 0$ and $t = T$ should be zero.)
During this movement the vibrations of the point $\vec{P}(t)$ should be minimal.
Tasks:

- Mathematical modelling of the crane system.

- Design of an heuristic algorithm to find the optimal steering functions
  $F_x(t), F_\varphi(t)$ for $t \in [0, 1]$.

- Numerical experiments.

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