MuJoCo: Projectile Launch Optimization (1)


Goal: dislodge
the yellow block

v

theta

MuJoCo: Projectile Launch Optimization (2)*

Using template_projectile.zip to get started

1. From <u>tiny.cc/mujoco</u> download template_projectile.zip and unzip in myproject

2. Rename folder template_projectile to projectile_opt

3. Make these three changes

   1. main.c — line 28, change template_projectile/ to projectile_opt/

   2. makefile — change ROOT = template_writeData to ROOT = projectile_opt also UNCOMMENT (del #) appropriate to your OS

   3. run_unix / run_win.bat change <template_projectile > to < projectile_opt >

4. In the shell, navigate to projectile_opt and type ./run_unix (unix)

* I don't have instructions for Windows. For Windows, use Ubuntu via Virtualbox.

MuJoCo: Non-linear root finding(1)
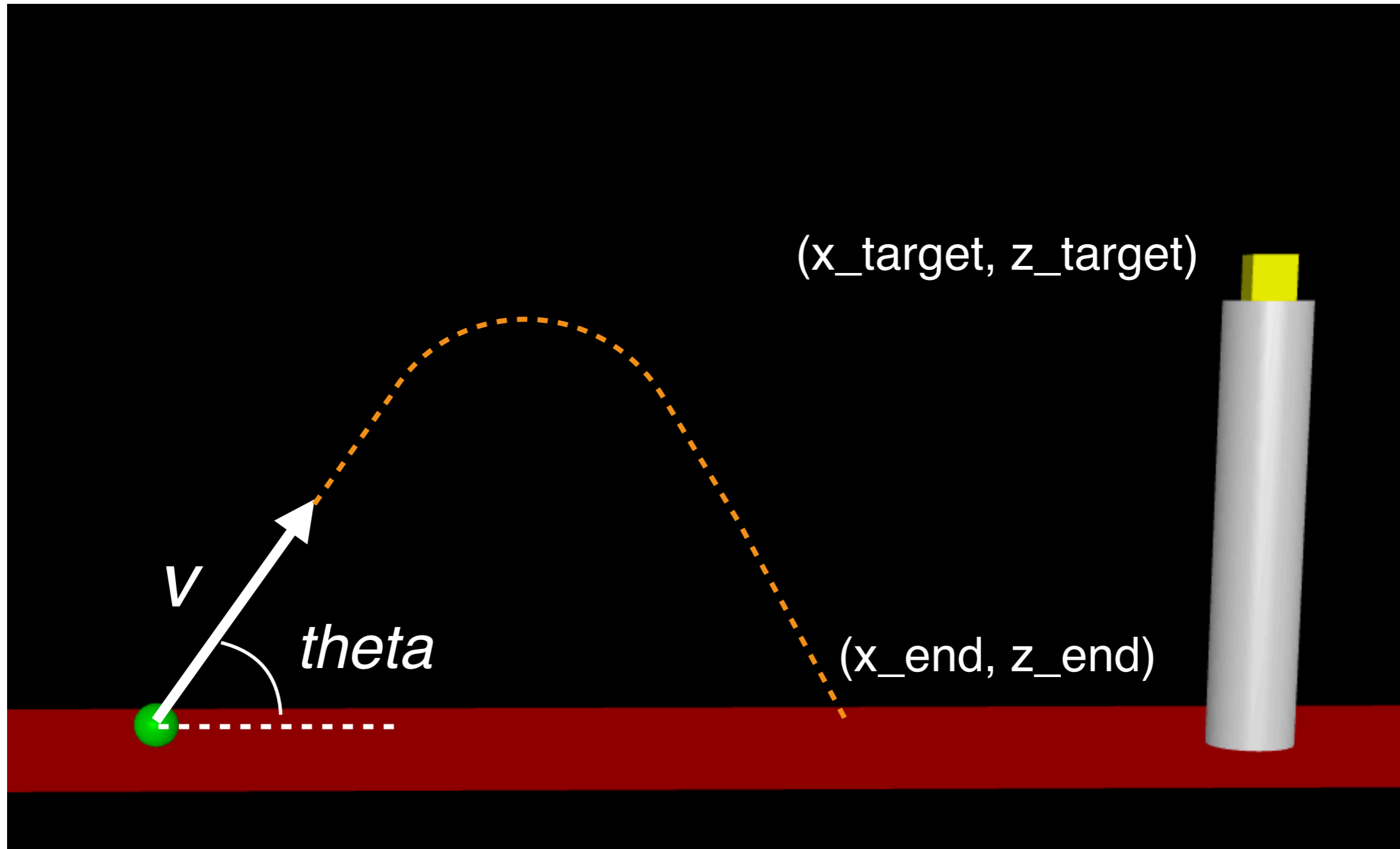
Inputs: v, theta, time of flight
Outputs: x_end, z_end

MuJoCo: Nonlinear root-finding (2)

$$\min_{x} f(x) = 0$$

subject to:

$$0.1 \leq v \leq \infty$$

$$0.1 \leq \theta \leq \pi/2$$

$$0.1 \leq t \leq \infty$$

$$x_{end} - x_{target} = 0$$

$$z_{end} - z_{target} = 0$$

MuJoCo: Nonlinear optimization (3)

$$\min_{x} f(x) = t$$

Minimize time

$$\text{subject to:}$$

$$0.1 \leq v \leq \infty$$

$$0.1 \leq \theta \leq \pi/2$$

$$0.1 \leq t \leq \infty$$

$$x_{end} - x_{target} = 0$$

$$z_{end} - z_{target} = 0$$