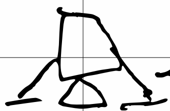
Variables



Position (x, y, z)

velocity (v_x, v_y, v_z)

Fuel

mass

throttle level

walltime

frametime

Due monday 18th of october.

Thrust will be constant.
↳ $3\,ms^{-2}$ when empty (0 fuel)

Throttle from 20% – 100%, also 0%
(doi.org/10.2514/6.2006-5220)

Increase at rate of 20% per second.

Space bar to increase thrust.
Shift to decrease thrust.

Arrow keys provide x-y thrust.
Much less than main thruster, but also
use less fuel. Instantly throttle to 100%.

Landing site will be rocky, must land in a clear
spot.

When $z = 0$, total velocity $(\sqrt{v_x, v_y, v_z})$
must be less than $1\,ms^{-1}$.

Graphics:

Use a single bitmap and zoom as z is decreased.

Crosshair in centre, for aiming lander.

readouts of fuel level, velocity, and height.

$$\frac{\vec{F}}{M} = \frac{d^2 \vec{r}}{dt^2}$$

Scientific computing:

Lab Sessions: Tuesday 14:00 - 17:00

Clive Granger, B29

Thursday 14:00 - 17:00

Making a cake. - Some people can make good cakes.

Analogies should not be taken too far.

Newton was better at physics than us.

"You can't learn computing remotely."

No exam!

Attending the labs is good.

If code isn't running on the marker's computer can appeal the mark and demonstrate on own computer.

Project:

Jupyter labdiary.

Figures, with captions describing how they were obtained.

Free choice of individual project.

each loop: $\overbrace{\qquad\qquad}^{dt}$

$a_z = F_z / total\_mass + moon\_g$

$v_z = v_z + a_z \times dt$

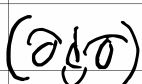
$z = dt \times v_z + z$

Todo:

Impliment withinpygame.
Implinent controls
Implinent graphics
Implinent speed checking on landing
Implinent readouts.

Emr

Big Balls



$u=0$

$s = \cancel{ut} + \frac{1}{2}at^2$

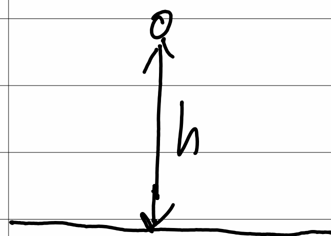
$s = \frac{1}{2}at^2$

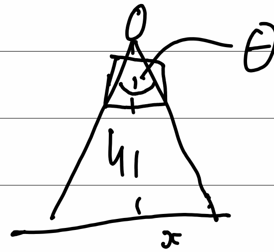
$\sqrt{\frac{2s}{a}} = t$

$s = 100M$

$a = -1.625$

$\therefore t = 11.19$ seconds





sohcahtoa

$$h \times \tan(\theta/2) = x$$

$$\underbrace{2h\tan(\theta/2)}_{\text{const}} \rightarrow 0.839$$

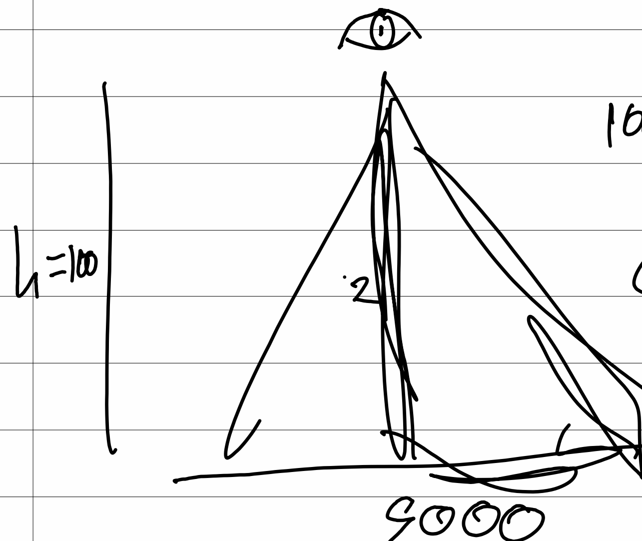
$\theta = 80^\circ$ seems reasonable

1.678

1 m up = Native res.

$2x = 800$ px at 1 m

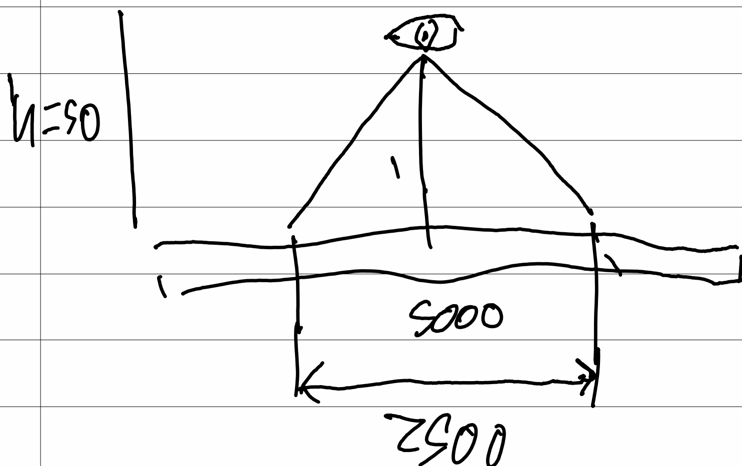
$$\frac{\text{moon-size}}{800} \times 1.678h = \text{scaled moon size}$$



$$100 \times \overbrace{1.678C}^{50.} = 5000$$

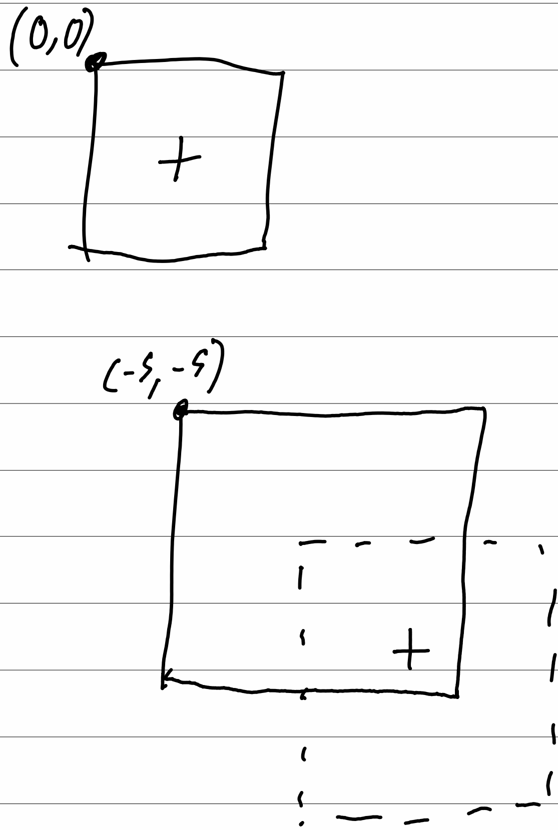
$$C = \frac{50.}{1.678}$$

$$C = 29.8$$



$$\frac{self.z}{100} \times 5000 = subsection\_size$$

$$subsection\_pos = \left(\frac{5000}{2} + self.x, \frac{5000}{2} + self.y\right)$$


(0,0)
(-5,-5)