WEDS
Bio-inspired robot

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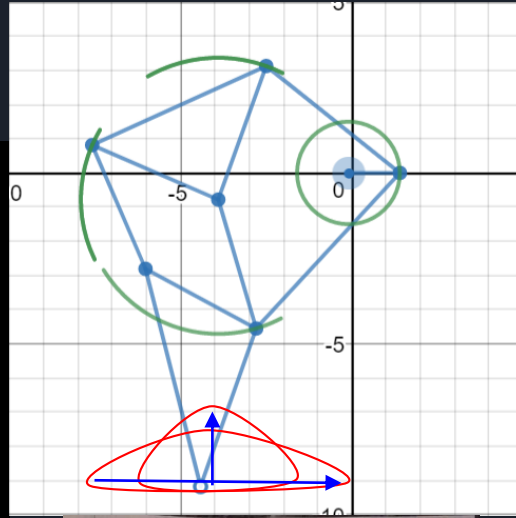
Design Inspiration

- ❏ Theo Jansen's Strandbeest
- ❏ Simplicity (less motors, less problems)
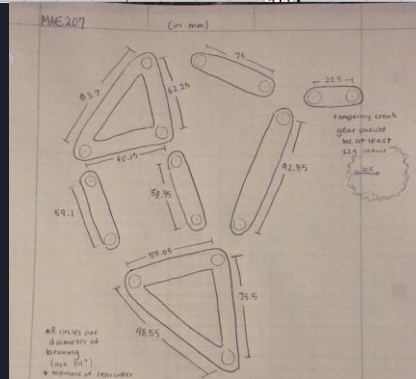- ❏ Less energy needed
- ❏ Symmetry
- ❏ Certain gait

Animaris Currens Ventosa, Oostvoorne, Netherlands (1993). Courtesy of Theo Jansen.
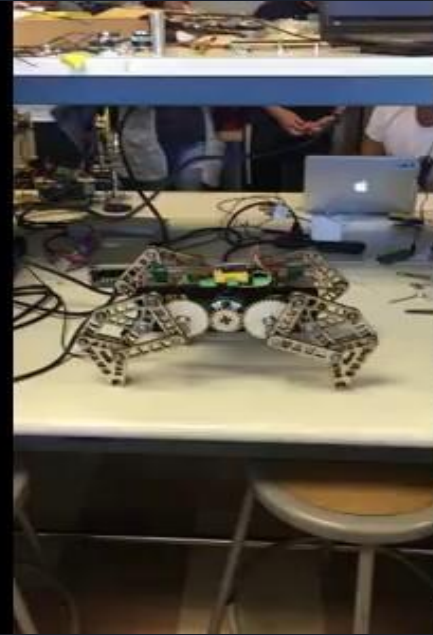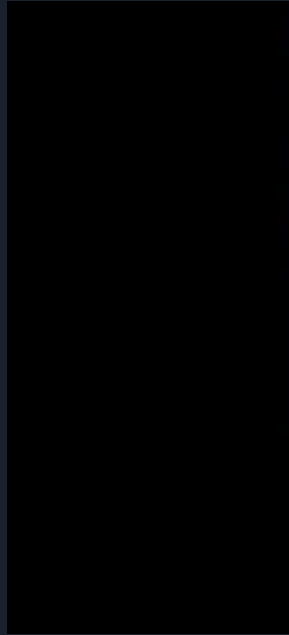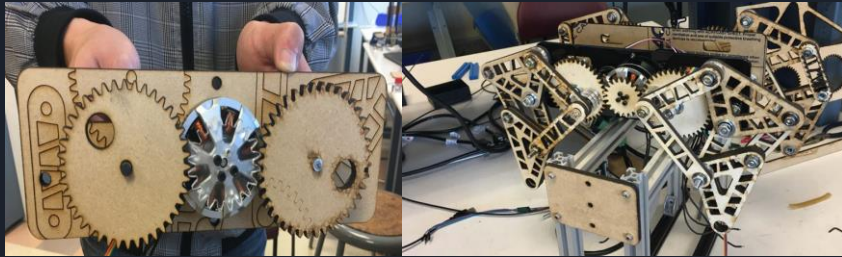
Leg modeling
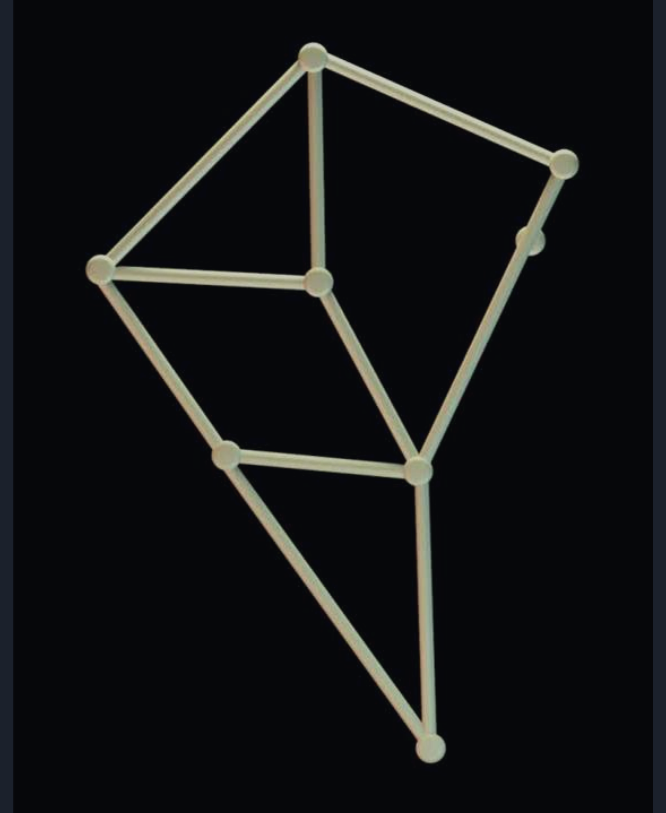
Before optimization:

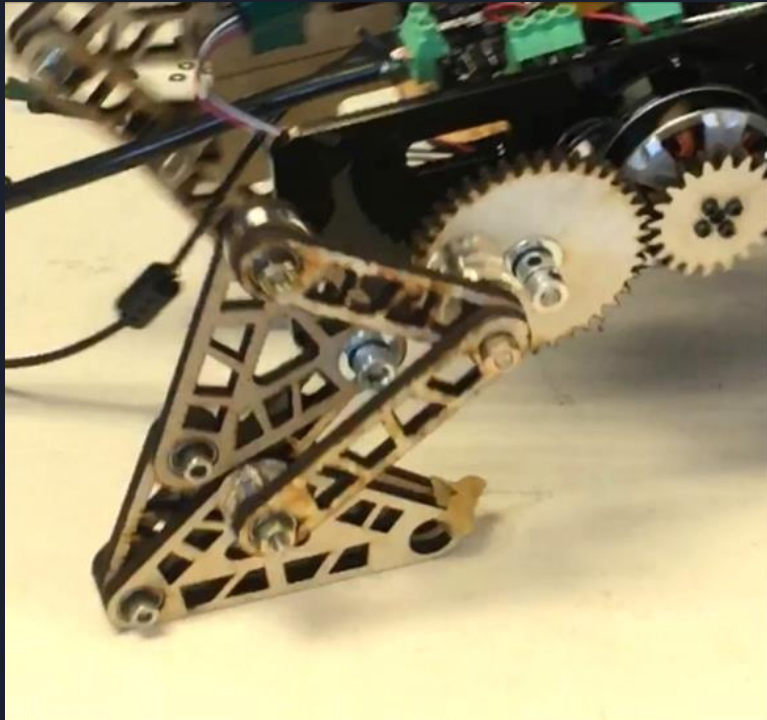After optimization:

Initial test after assembly

Challenges

- ❏ Friction in the joints
- ❏ Clearance and spacing given fixed length shafts
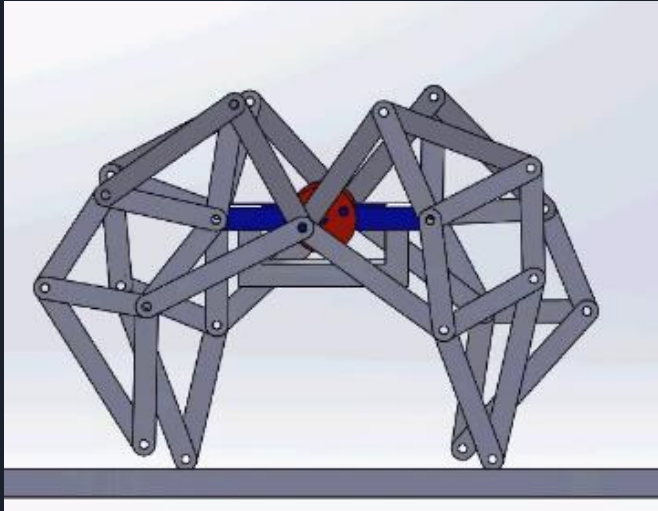- ❏ Foot traction
- ❏ Legs locking

Adding springs

Wider feet + grip

❏ Increase stability by widening the foot

❏ Glue gun across the bottom for traction

0.3 m/s in both directions

Turning

Controls

Move forward in a straight line -

- ❏ leg.set_joint_pos(-number_of_revolutions*2*pi + pi/2, number_of_revolutions*pi + pi/2, 0,0,-10, 10)
- ❏ pi/2 is the home position (one pair of legs up, one down)
- ❏ 5 revolutions of the leg/ meter (10 revolutions of the motor)

Turning -

- ❏ Change current gain to different values for each motor (e.g.set_joint_pos(x1,x2,0,0, -9,10))

Moving backwards -

- ❏ Flip sign for motor 1 and motor 2

Future Improvements

- ❏ Use better fitting bearings to reduce wiggle (unwanted leaning)
- ❏ Add more legs in various stages of the gait for stability and turning more efficiently
- ❏ Decrease mass by using aluminum shafts instead of steel
- ❏ Adding more motors for extra complexity
- ❏ Vary leg height to be able to step over obstacles