

Motion Planning

Collision Detection

# Collision detection

Instead of representing  $\mathcal{C}_{\text{obst}}$  explicitly, practical algorithms are built around **collision detection**.

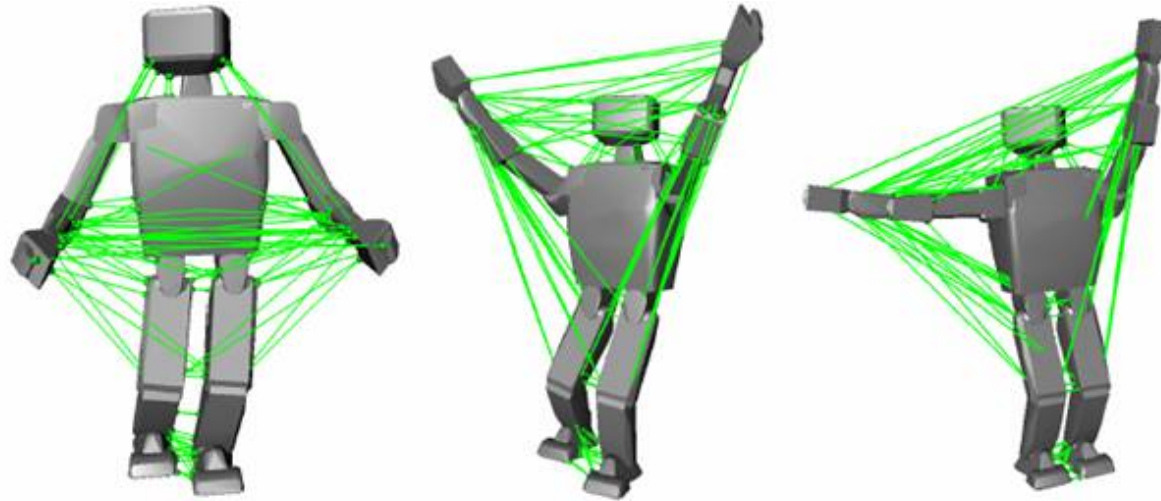
We generally need two forms of collision detection:

Given a configuration, determine whether or not it's an obstacle configuration.

Given a short path in configuration space, determine whether or not any configuration along that path is an obstacle configuration.

# Collision detection overview

To perform collision checks, transform (i.e. translate, rotate, and adjust joints) the geometric model of the robot, then test whether this transformed version intersects any obstacles.



We'll treat collision detection basically as a black box, but there are efficient geometric algorithms for this, especially if we are willing to accept an approximation.