Workspace Analysis

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Applications: Kinematic Workspace Analysis

- Robot Design Evaluation
- Robot Workspace Placement
Applications: Kinematic Workspace Analysis

• Robot Design Evaluation
  ✓ reachability analysis
    ▹ e.g. home service robots
      ‣ reach shelves, drawers, etc.
      ‣ reach the floor
      ‣ use all joints?, use a subset of joints?
  ✓ Cartesian trajectories
    ▹ e.g. open a fridge door
Kinematic Workspace Analysis
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Reachable in collision-free way (% of total)

- Countertop
- Floor and wall
- Fridge
- Pantry shelves
- Shelf with bins, roomy
- Mean

PR2
Kuka LWR
UR5
Kinematic Workspace Analysis

• Robot Workspace Placement
  ✓ e.g. an industrial robot needs to be setup in a workspace
  ✓ not clear where it should go in the workspace
  ✓ reachability analysis can help
Kinematic Metrics

• E.g. manipulability
  ✓ measure of how well the robot can move in different directions

• E.g. payload
  ✓ how much the robot can pick up in different configurations
Metrics