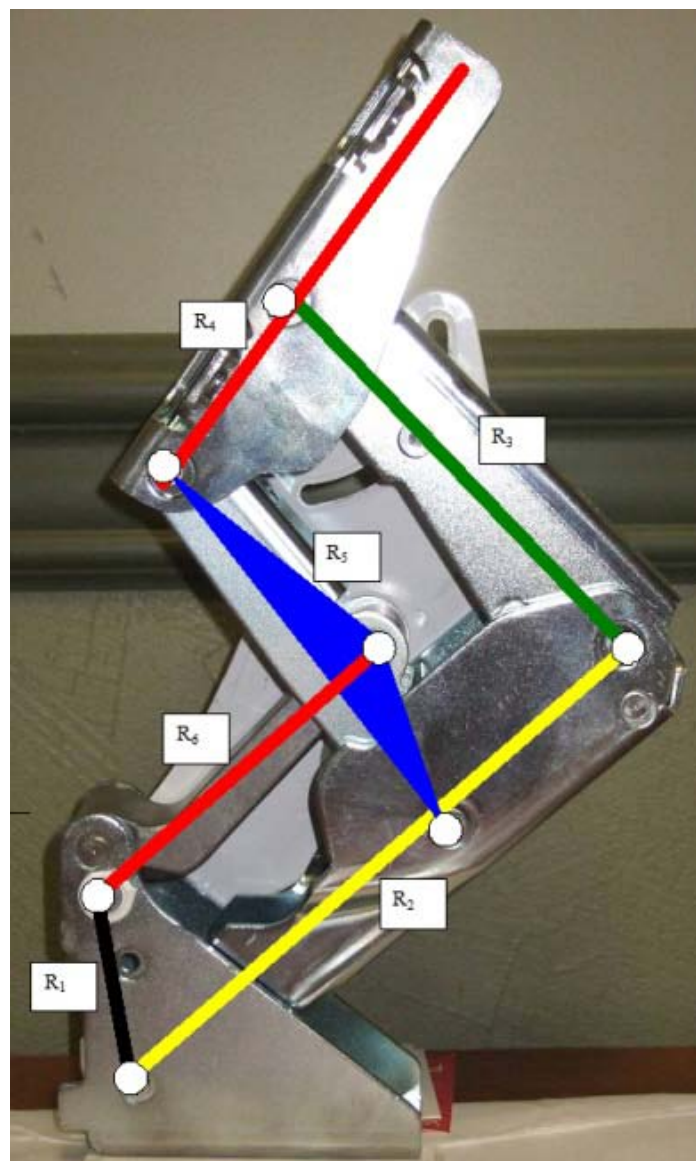


Atlas of Structures, Mechanisms, and Robots

Dr. Bob Williams, williar4@ohio.edu

Mechanical Engineering, Ohio University

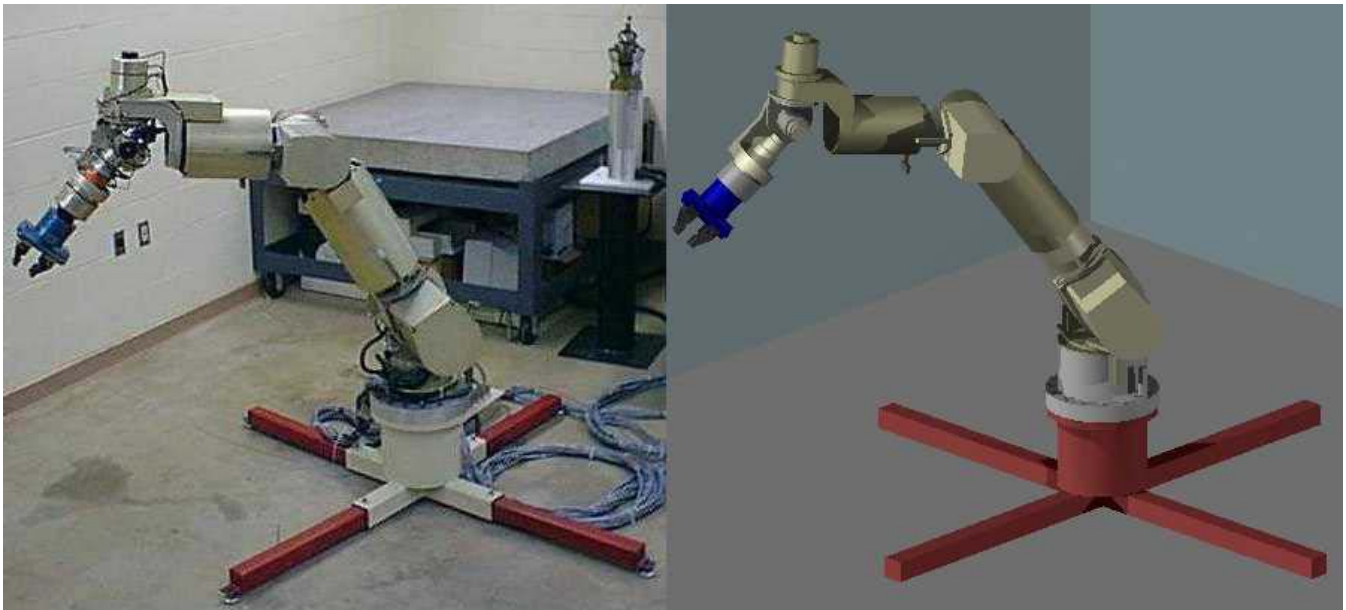
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Hettich Hinge Watt I 6-bar Mechanism

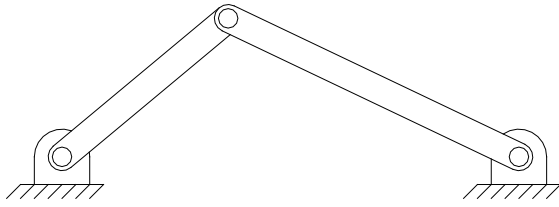
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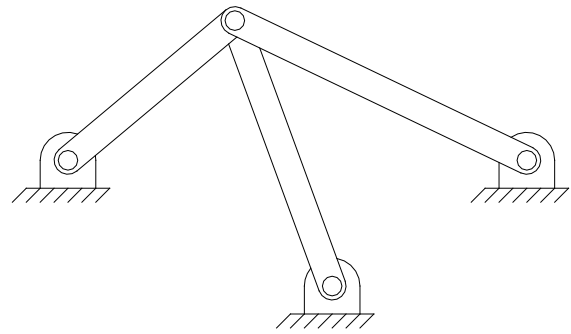


NASA 8-dof ARMII Robot

Zero-dof (or less) Structures

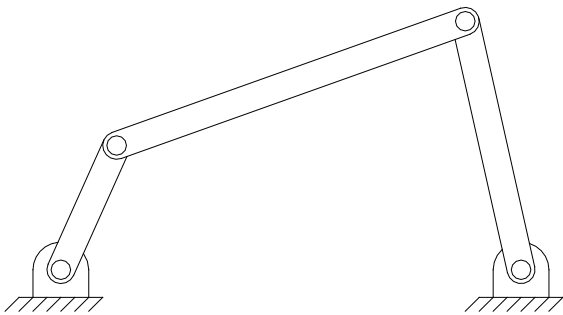


Statically Determinate Structure

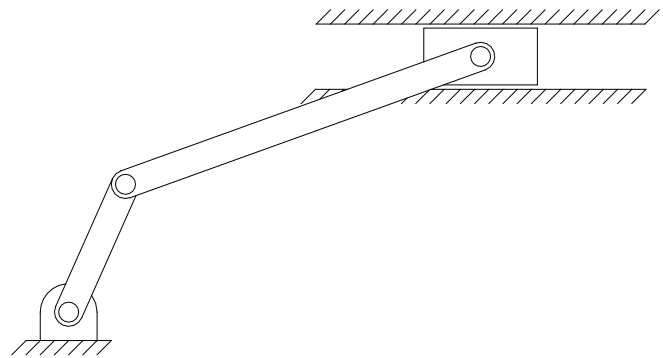


Statically Indeterminate Structure

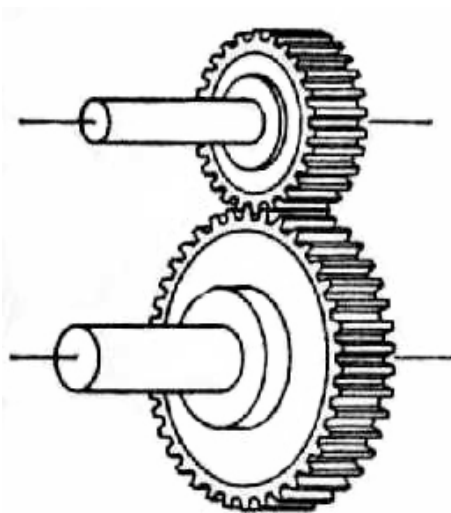
One-dof Mechanisms



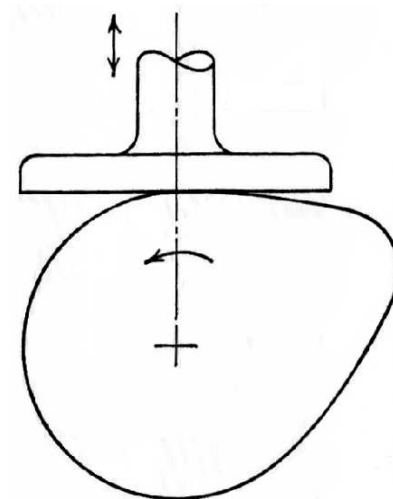
4-Bar Mechanism



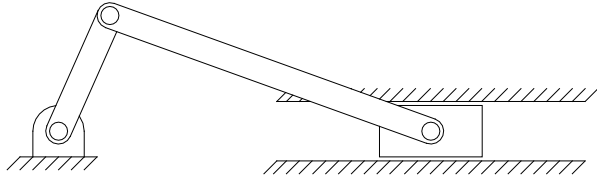
Offset Slider-Crank Mechanism



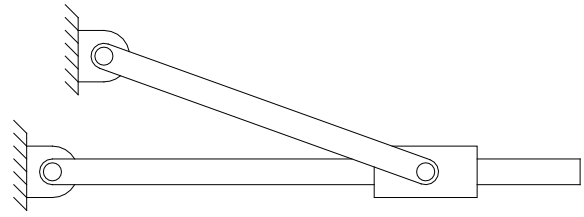
Spur Gear Mechanism



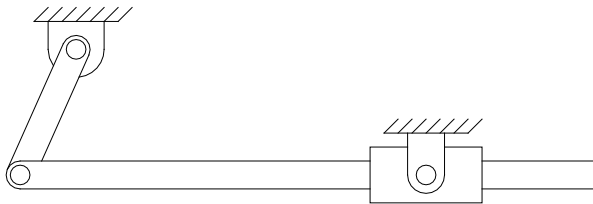
Cam-and-Follower Mechanism



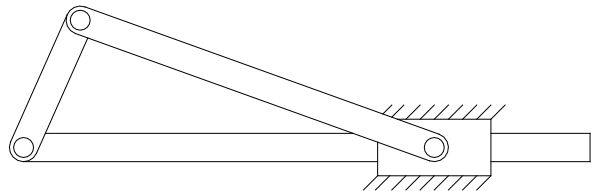
Slider-Crank Mechanism Inversion 1



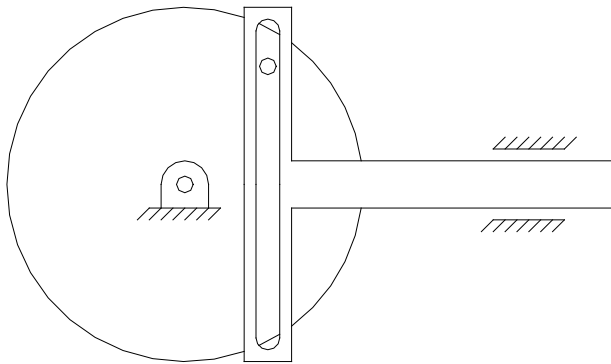
Slider-Crank Mechanism Inversion 2



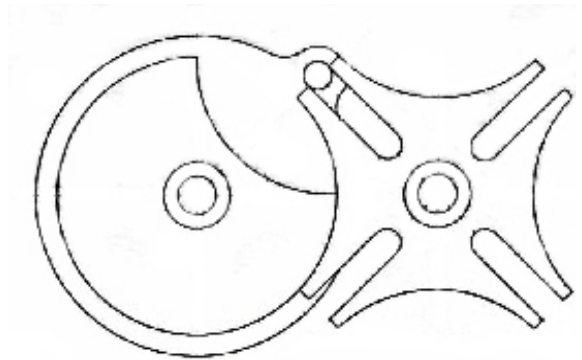
Slider-Crank Mechanism Inversion 3



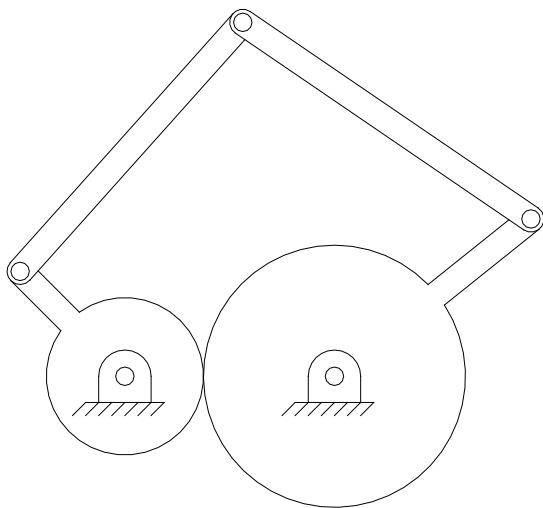
Slider-Crank Mechanism Inversion 4



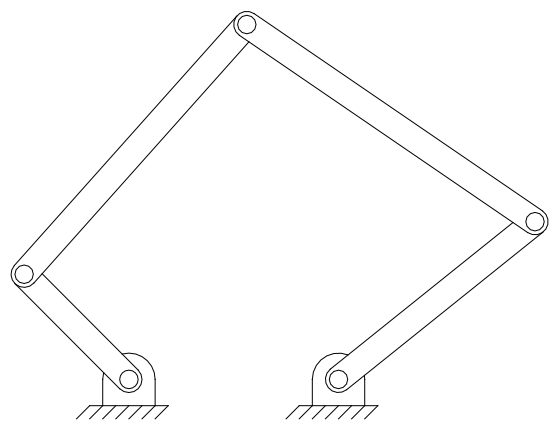
Scotch-Yoke Mechanism



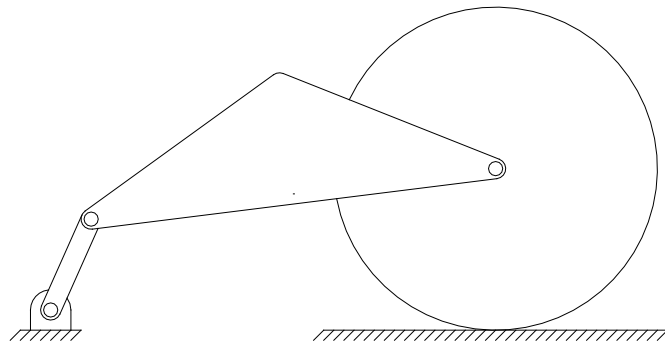
Geneva Wheel Mechanism



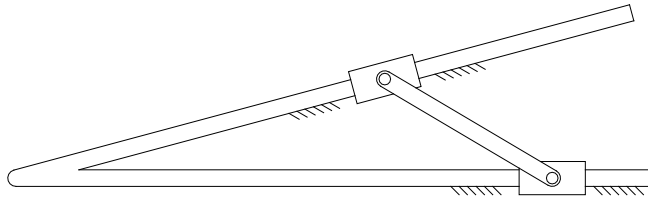
Geared 5-Bar Mechanism



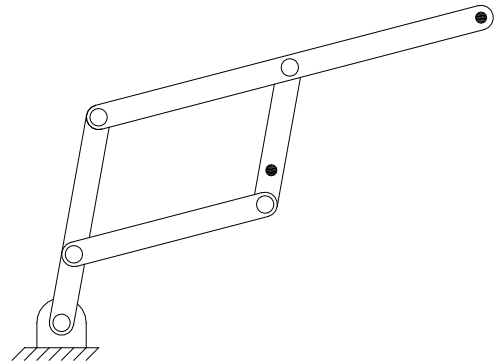
2-dof 5-Bar Parallel Robot



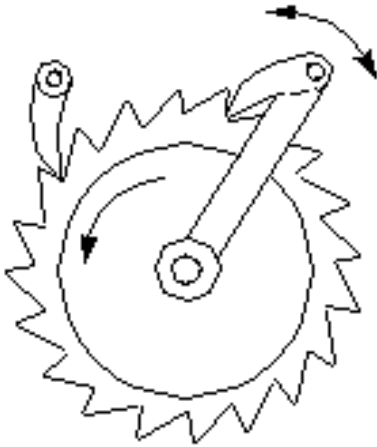
4-Bar Rolling Mechanism



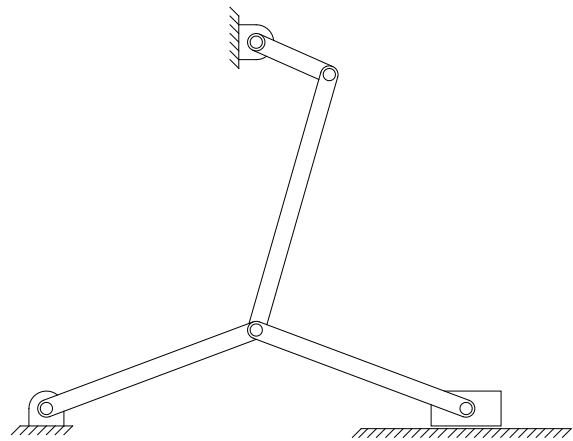
Dual-Slider Mechanism



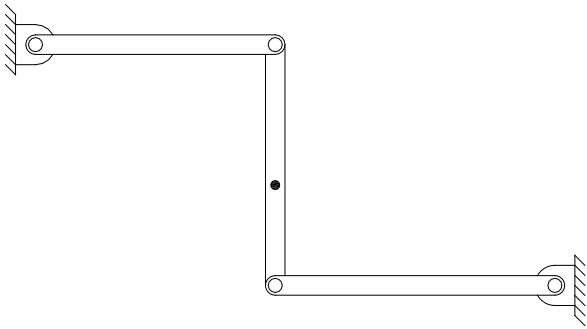
Pantograph Robot



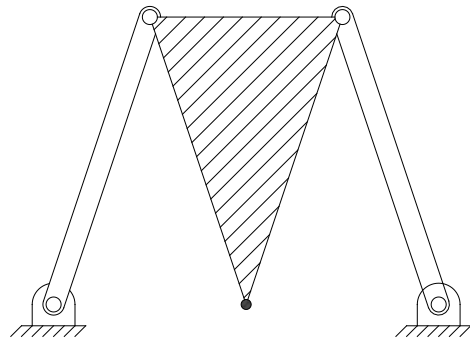
Ratchet Mechanism



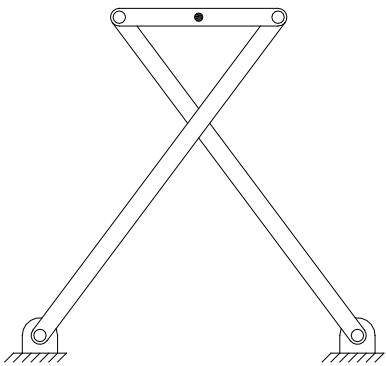
Toggle Mechanism



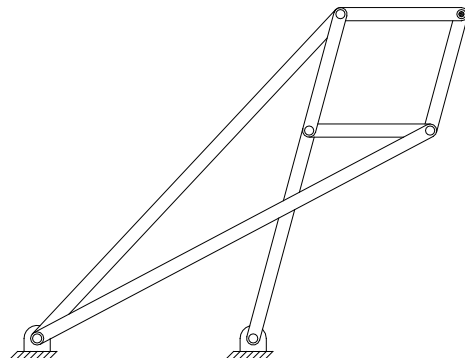
**Watt Straight-Line Mechanism
(approximate)**



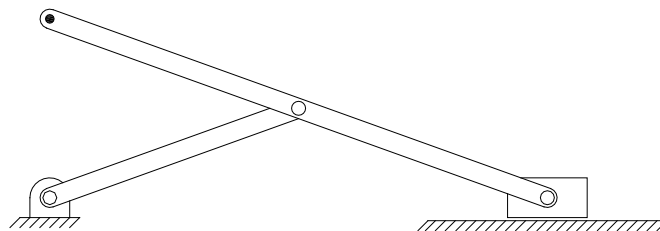
**Roberts Straight-Line Mechanism
(approximate)**



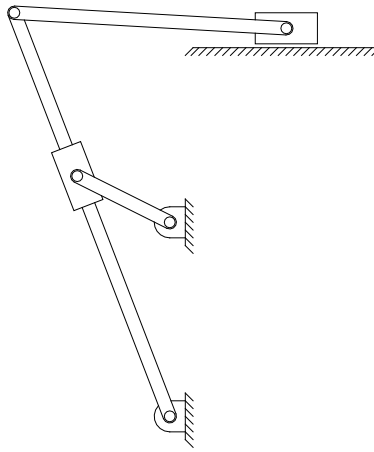
**Chebyshev Straight-Line Mechanism
(approximate)**



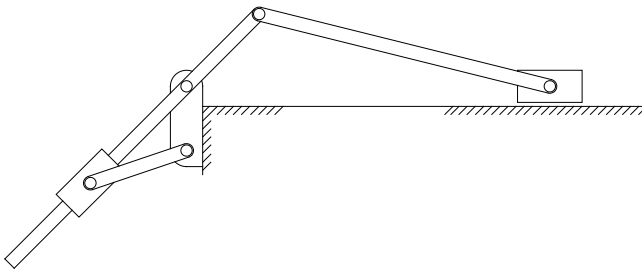
**Peaucellier Straight-Line Mechanism
(exact)**



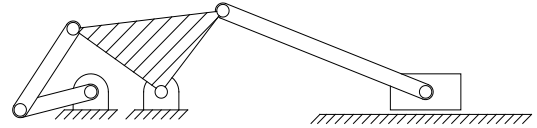
**Scott-Russell Straight-Line Mechanism
(exact)**



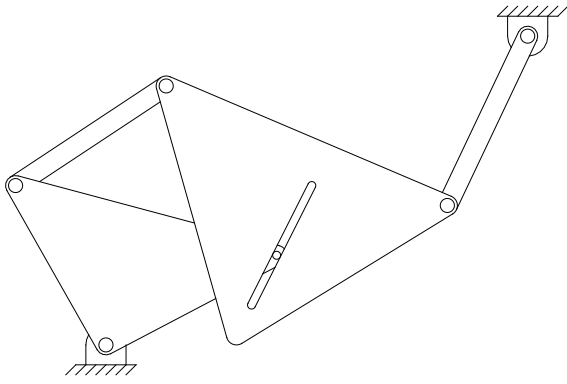
Crank-Shaper Quick-Return Mechanism



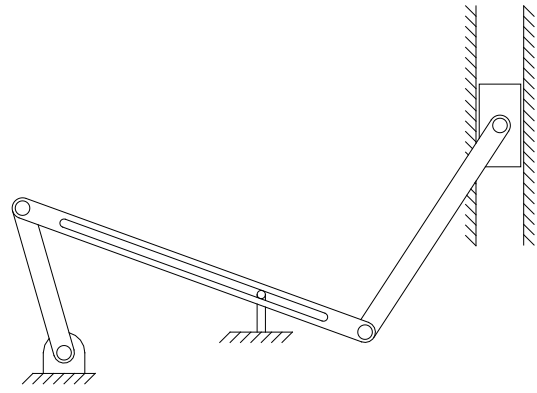
Whitworth Quick-Return Mechanism



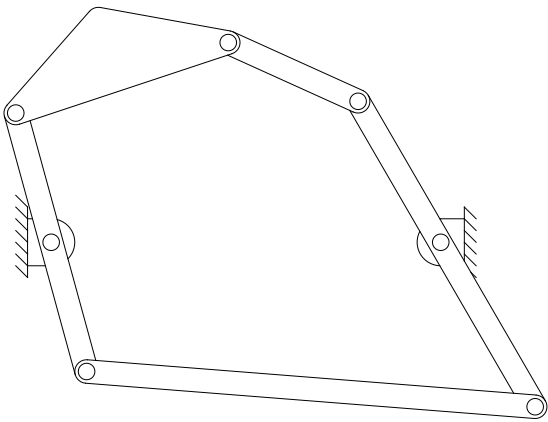
Drag-Link Quick-Return Mechanism



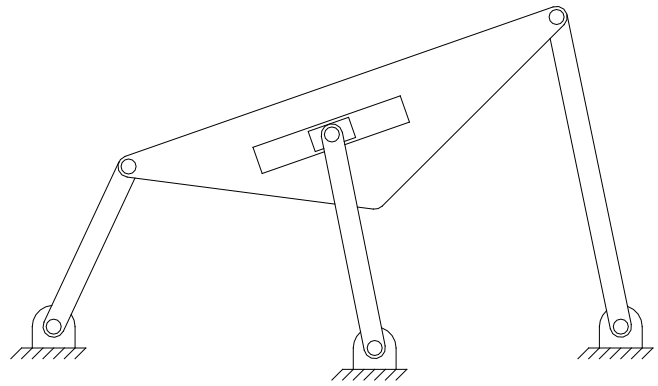
5-bar Slotted Mechanism



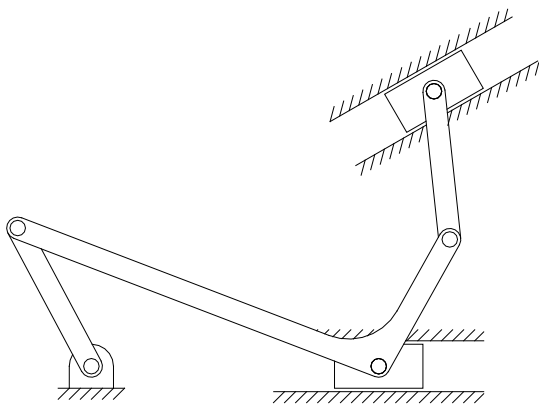
5-bar Slotted Slider Mechanism



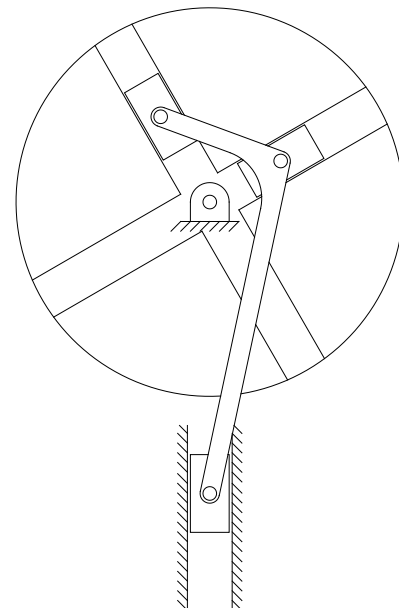
6-bar Mechanism



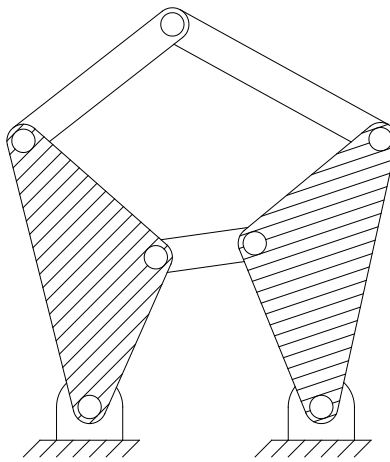
6-bar Single-Slider Mechanism



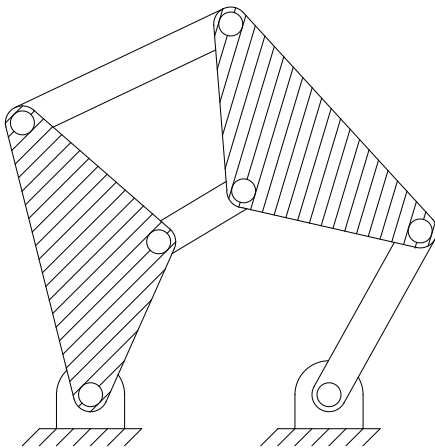
6-bar Crank Dual-Slider Mechanism



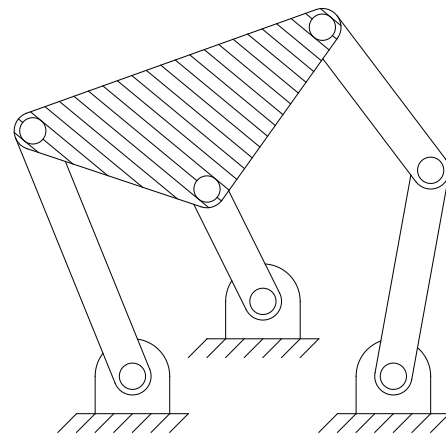
6-bar Crank Triple-Slider Mechanism



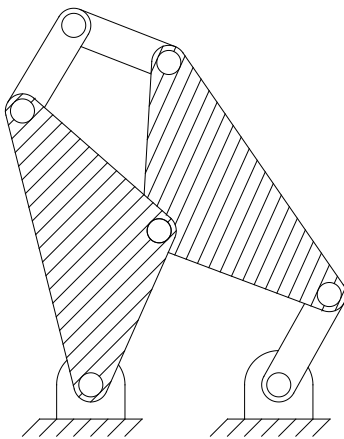
Stephenson I 6-Bar Mechanism



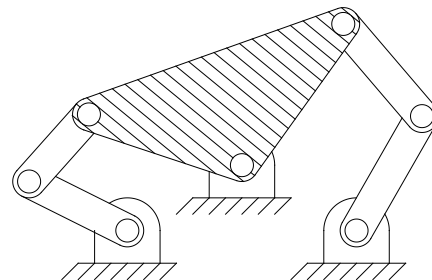
Stephenson II 6-Bar Mechanism



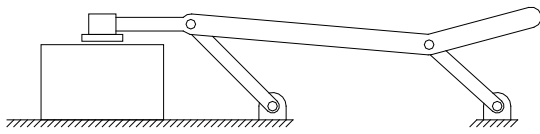
Stephenson III 6-Bar Mechanism



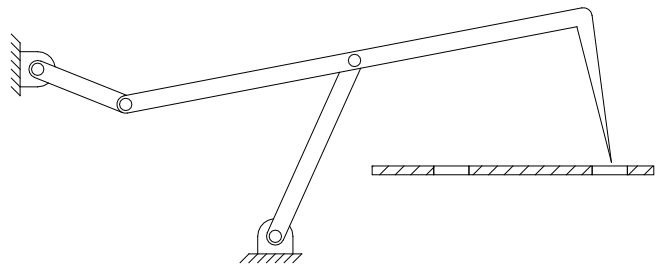
Watt I 6-Bar Mechanism



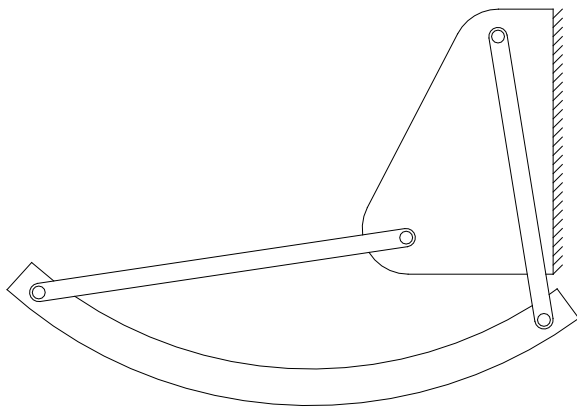
Watt II 6-Bar Mechanism



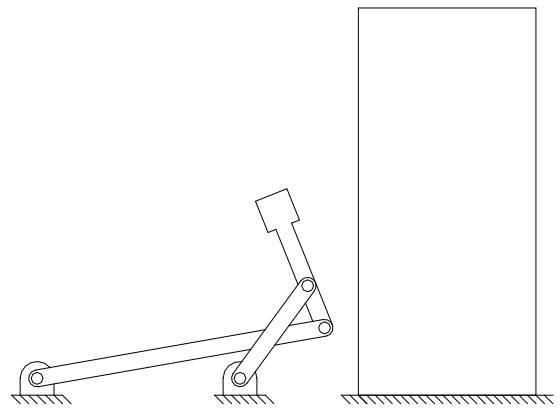
4-Bar Clamp Mechanism



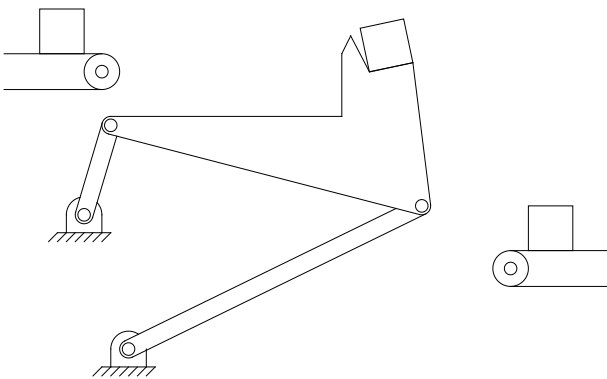
4-Bar Film Advance Mechanism



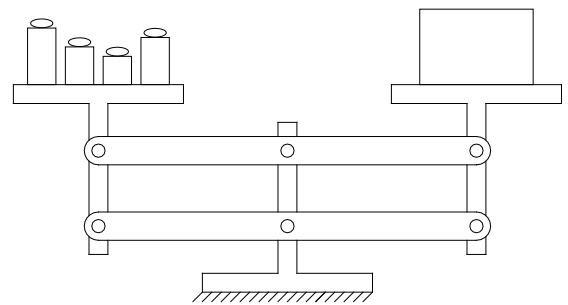
4-Bar Aircraft Carry-on Bin Mechanism



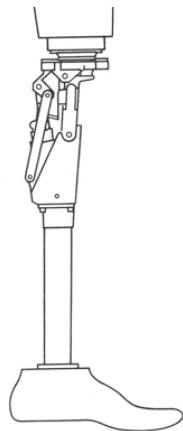
4-Bar Bass Drum Pedal Mechanism



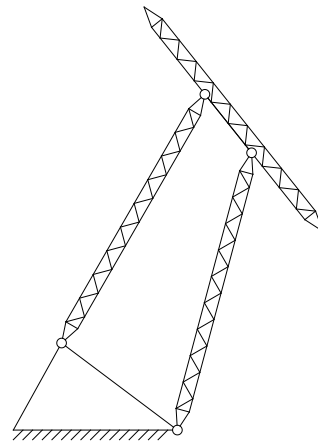
4-Bar Conveyor Transfer Mechanism



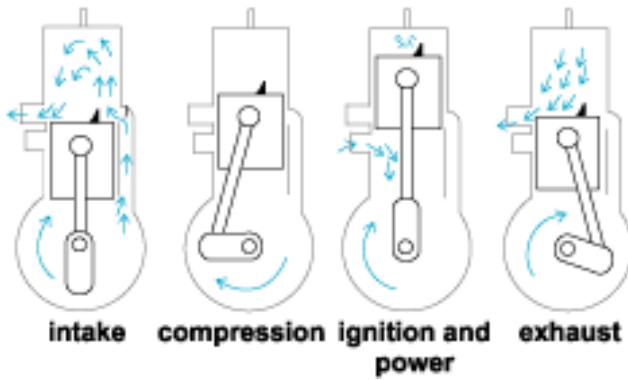
Dual 4-bar Balance Scale Mechanism



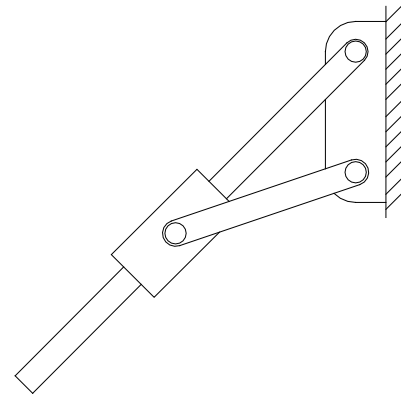
4-Bar Knee Prosthesis Mechanism



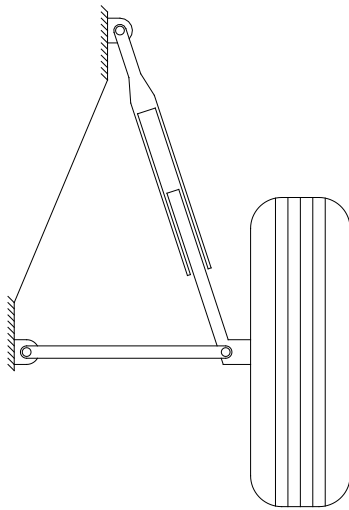
4-Bar Crane Mechanism



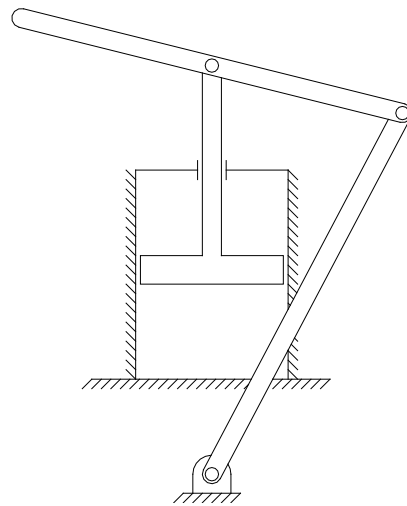
2-Stroke Internal Combustion Engine Mechanism S-C Inversion 1



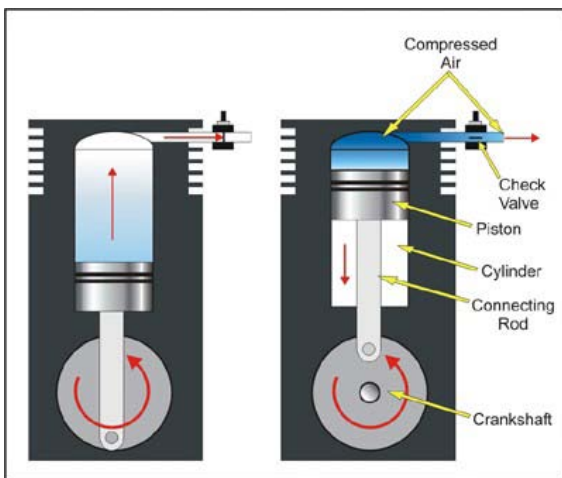
Whitworth Mechanism S-C Inversion 2



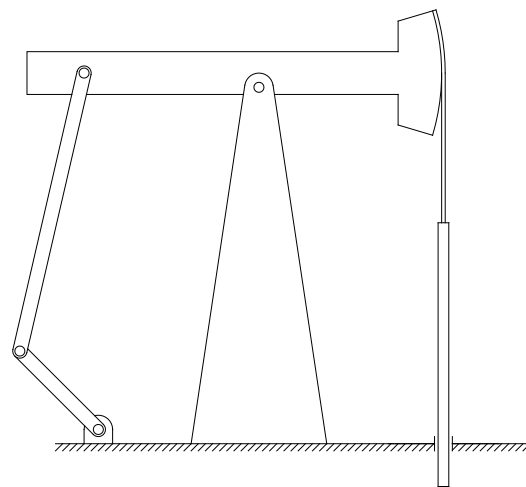
MacPherson Strut Mechanism S-C Inversion 3



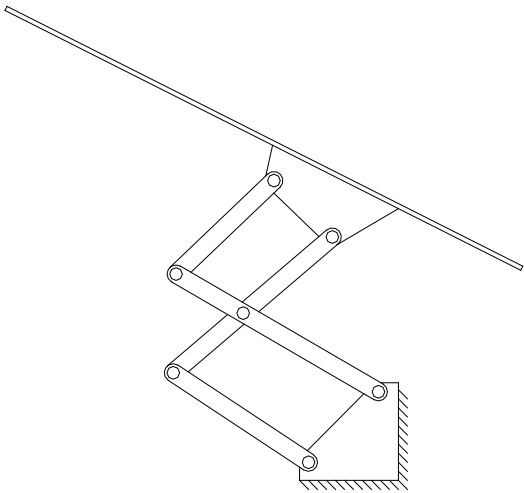
Pump Mechanism S-C Inversion 4



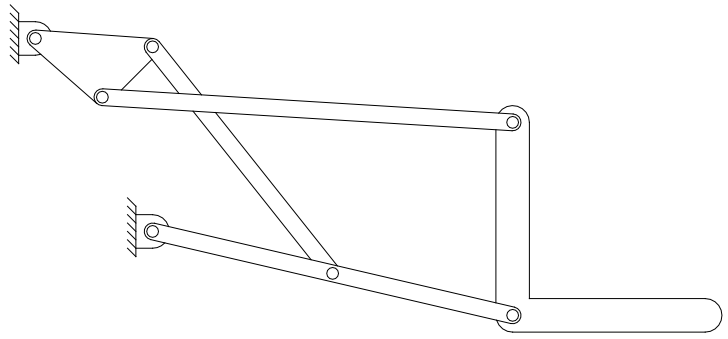
Air Compressor Mechanism S-C Inversion 1



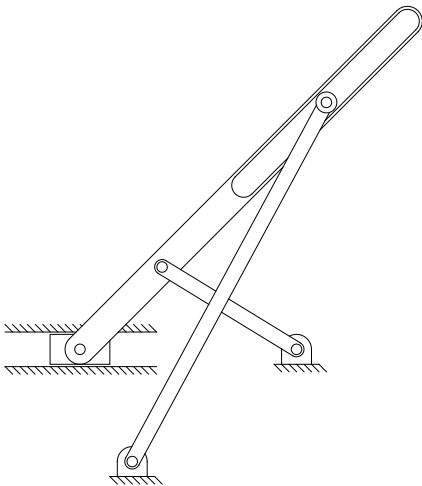
5-bar Oil Well Pump Mechanism



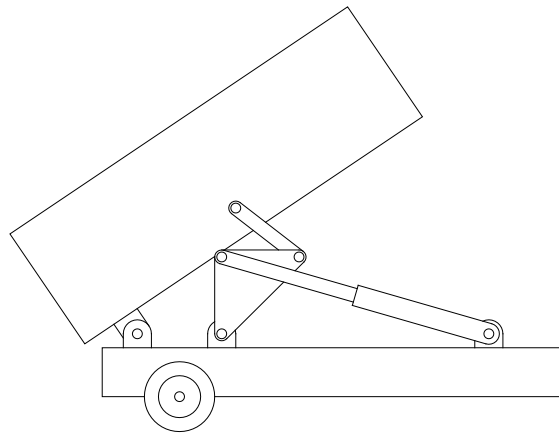
6-bar Car Hood Mechanism



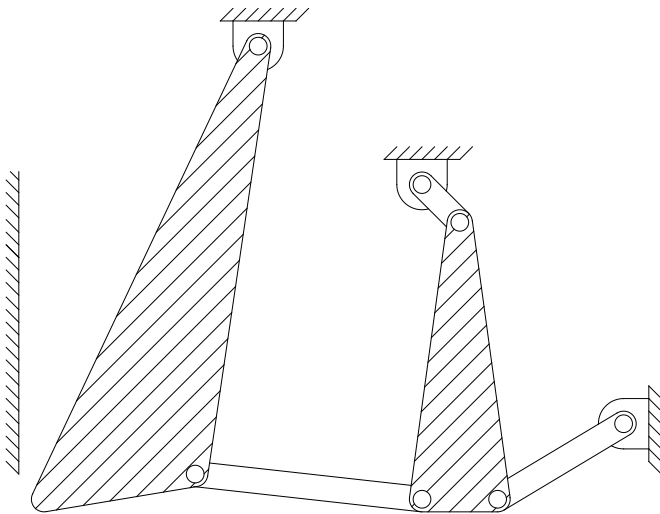
6-bar Lift Mechanism



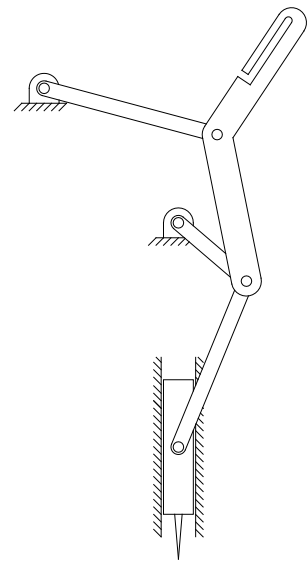
6-bar Window Mechanism



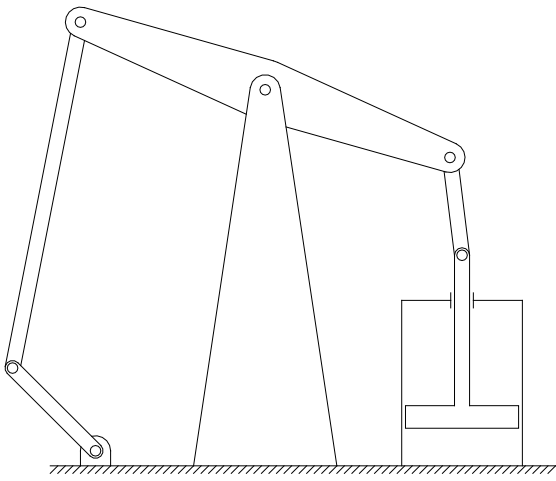
6-bar Dump Truck Mechanism



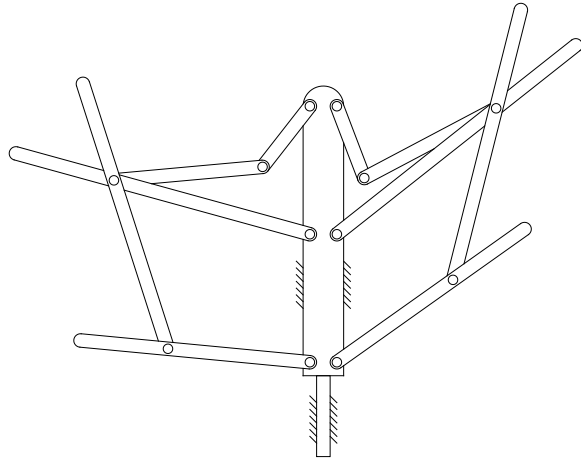
6-bar Rock Crusher Mechanism



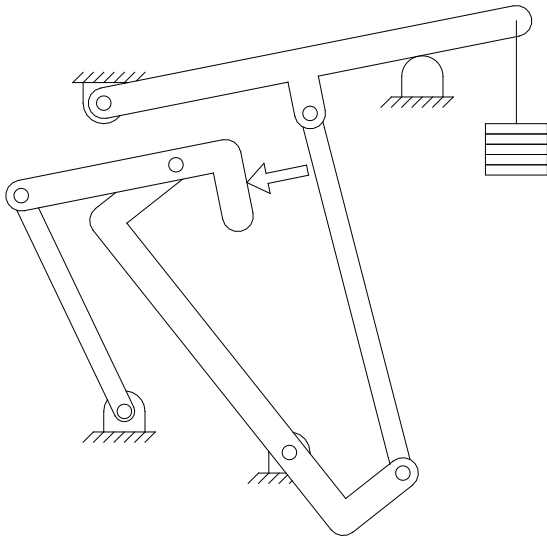
6-bar Sewing Machine Mechanism



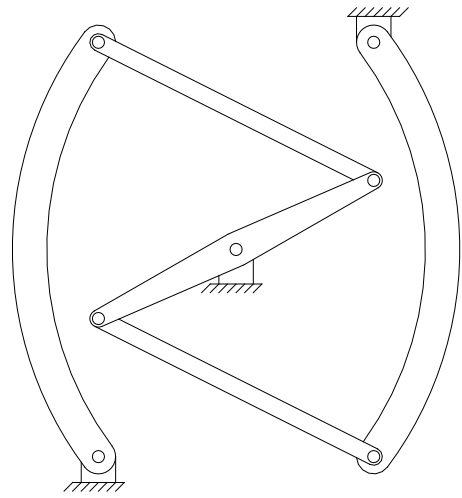
6-bar Watt Steam Engine Mechanism



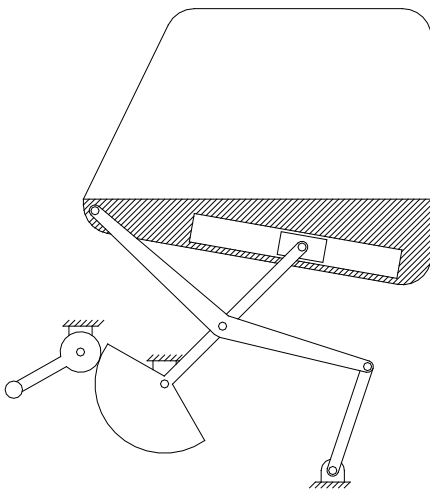
Dual 6-bar Mechanism Collapsible Music Stand



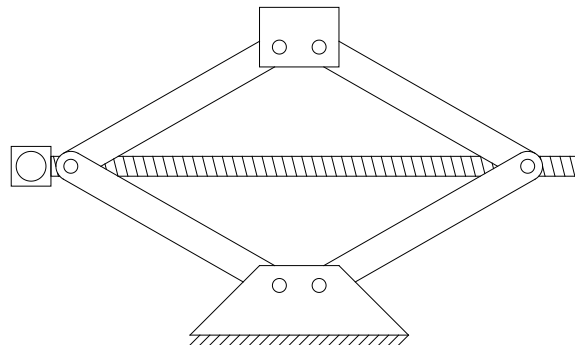
6-bar Leg Press Mechanism



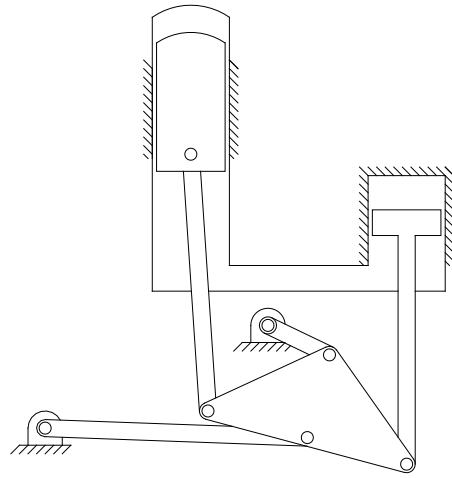
6-bar Drum Brake Mechanism



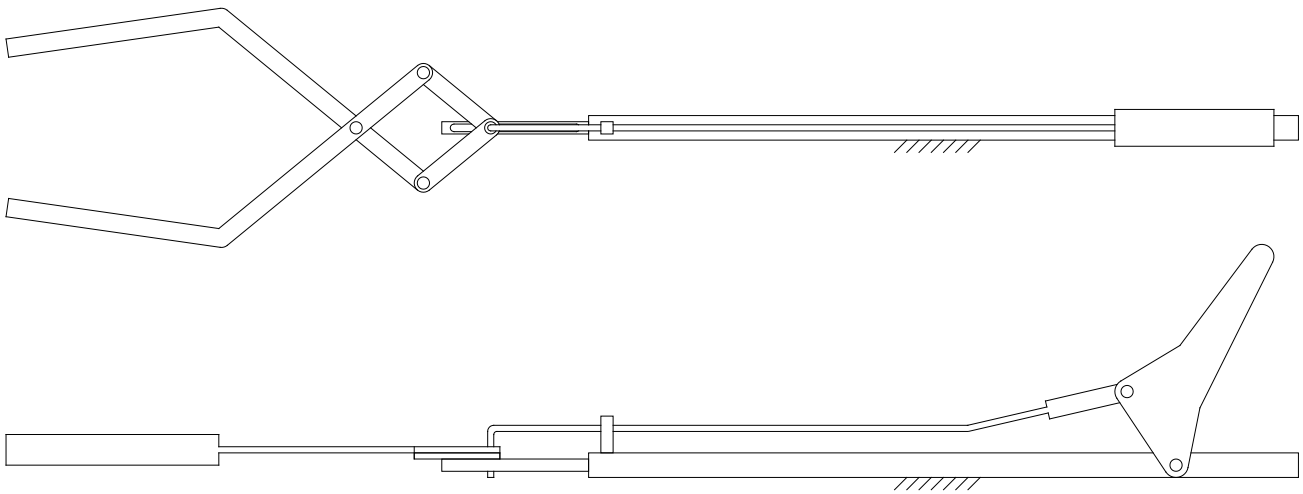
7-bar Car Window Mechanism



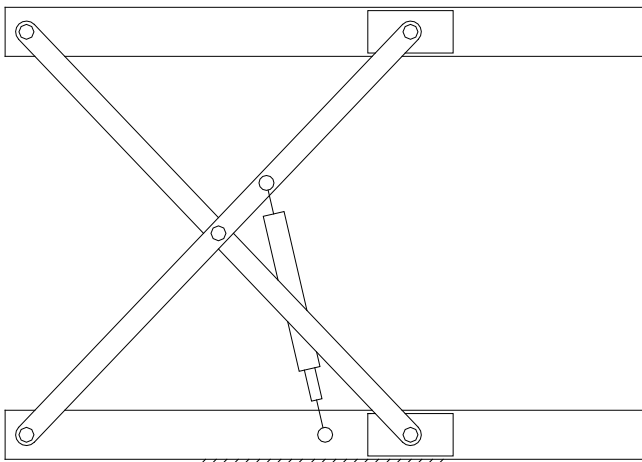
7-bar Car Jack Mechanism



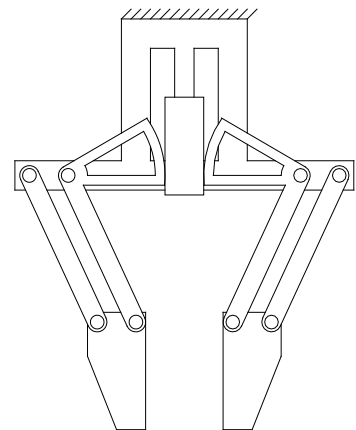
7-bar Ross Stirling Engine Mechanism



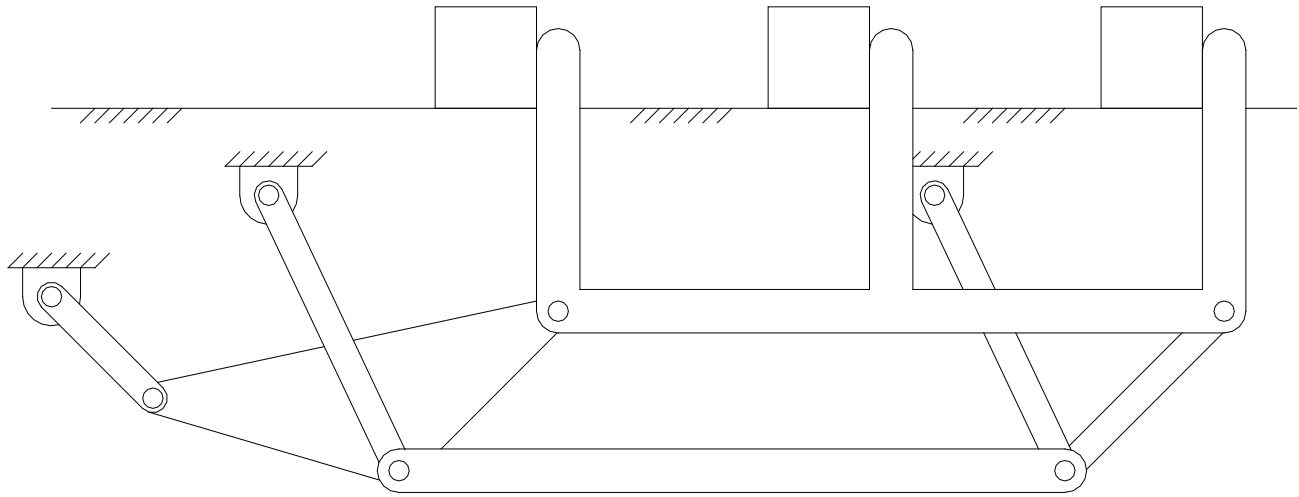
7-bar Grabber/Extender Compound Mechanism



8-bar Scissor-Lift Mechanism

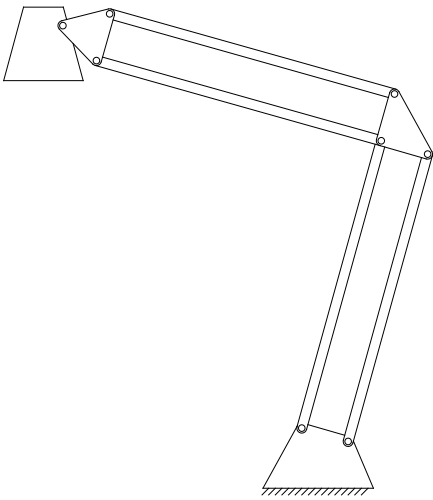


8-bar Robot Gripper Mechanism

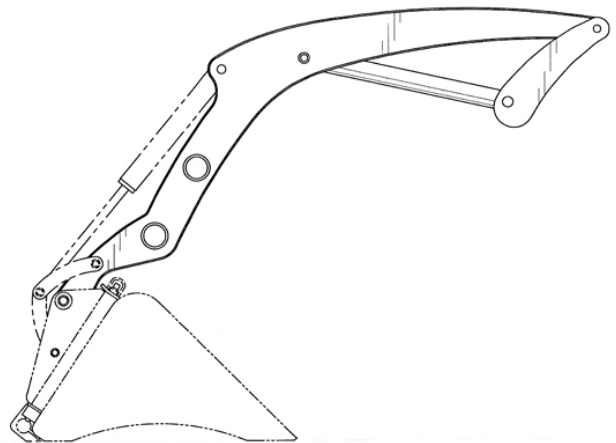


8-Bar Straight-Line Transfer Mechanism

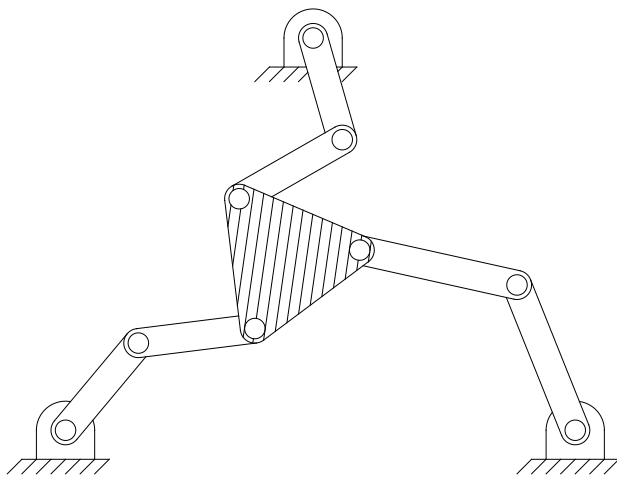
Multi-dof Robots



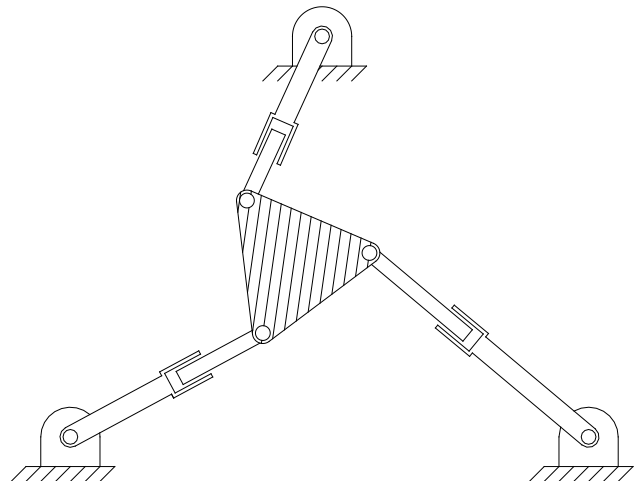
3-dof 8-bar Desk Lamp Robot



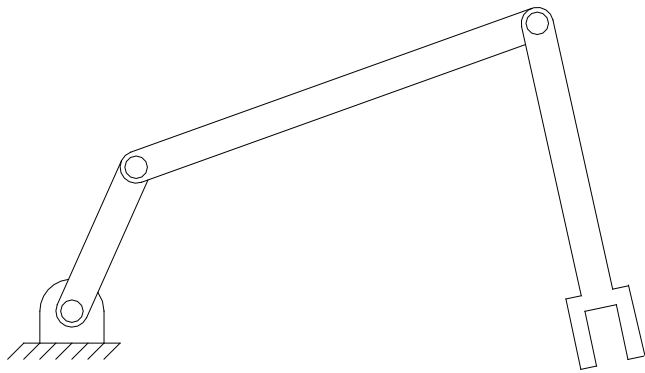
2-dof 9-bar Front-End Loader Robot



3-dof 3-RRR Parallel Robot



3-dof 3-RPR Parallel Robot



Planar 3-dof Robot



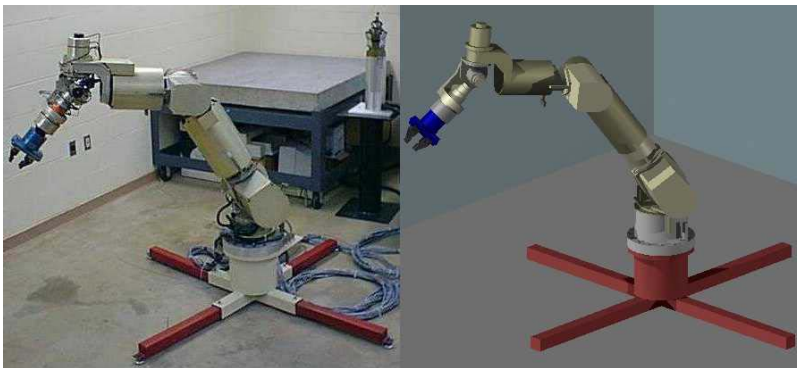
Adept 4-dof SCARA Robot



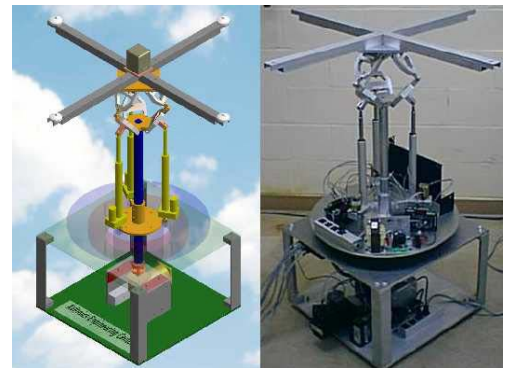
Mitsubishi 5-dof Robot



PUMA 6-dof Robot

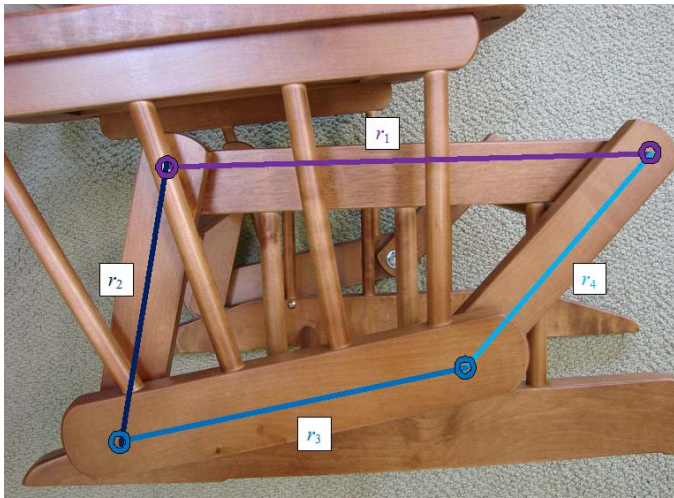


NASA 8-dof ARMII Robot

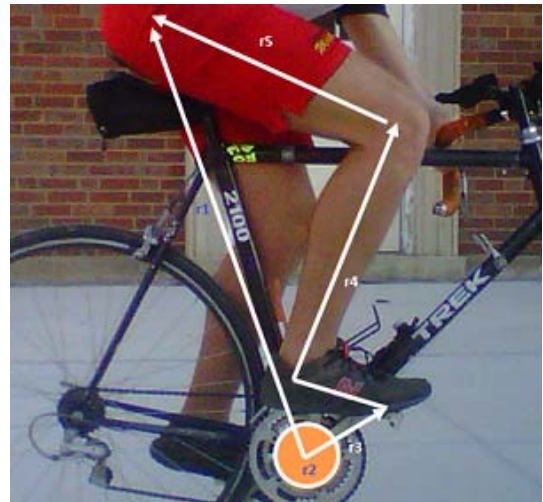


3-dof Carpal Wrist Robot

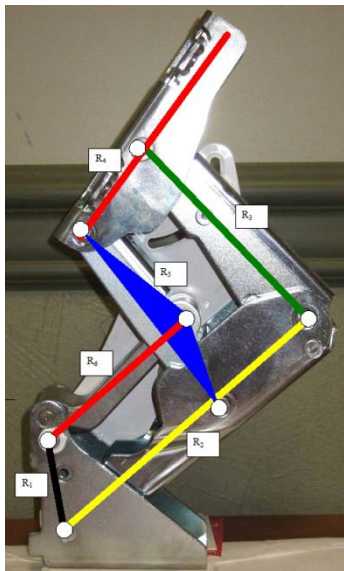
Real-World Mechanisms / Kinematic Diagrams



4-bar Glider-Rocker Mechanism



Bicycle/Human Leg 4-bar Mechanism (lock ankle)



Hettich Hinge Watt I 6-bar Mechanism

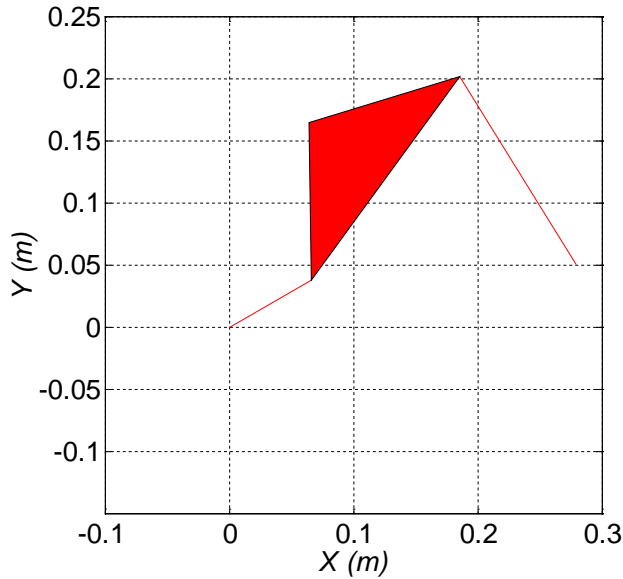


Mountain Bike Rear Suspension Mechanism

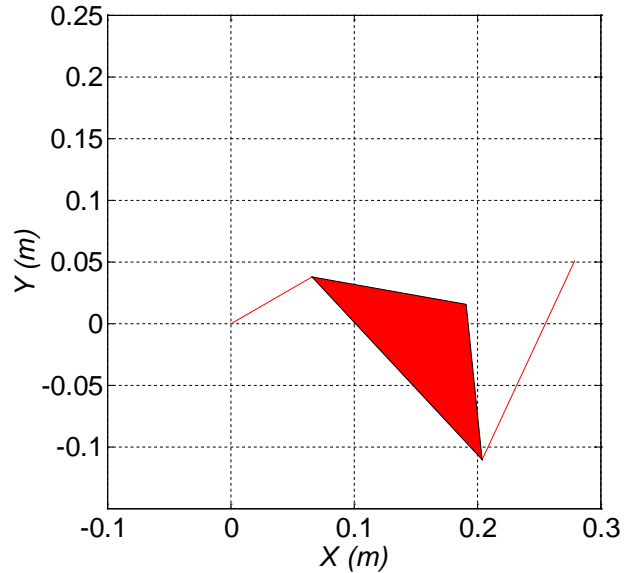
MATLAB Simulation/Animation Gallery

All of the following MATLAB graphics/animations were created by Dr. Bob at Ohio University. These are presented according to the Ohio University course they support.

ME 301 Kinematics & Dynamics of Machines

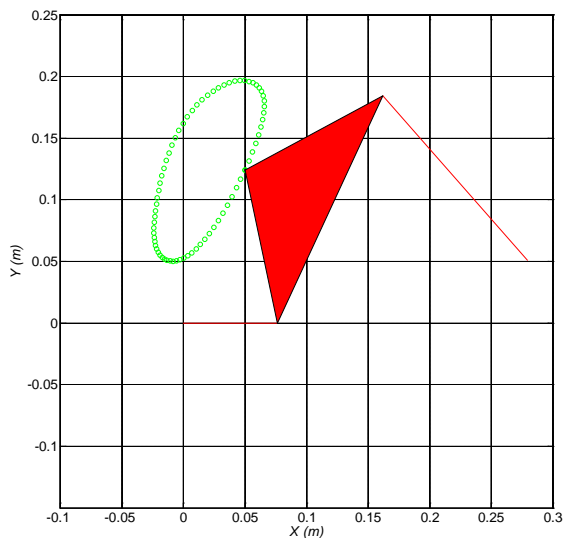


Open Branch

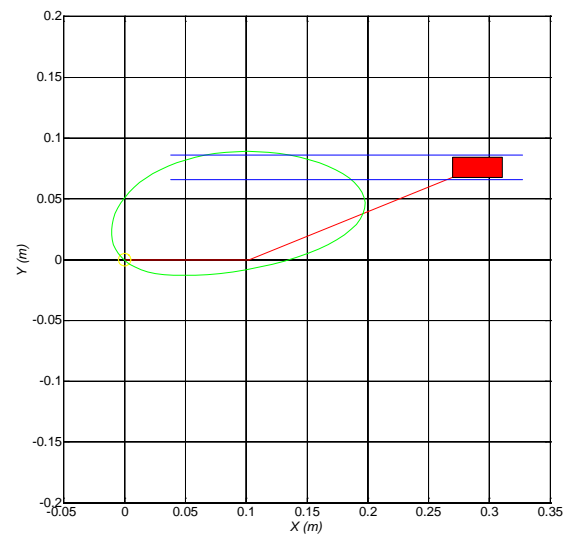


Crossed Branch

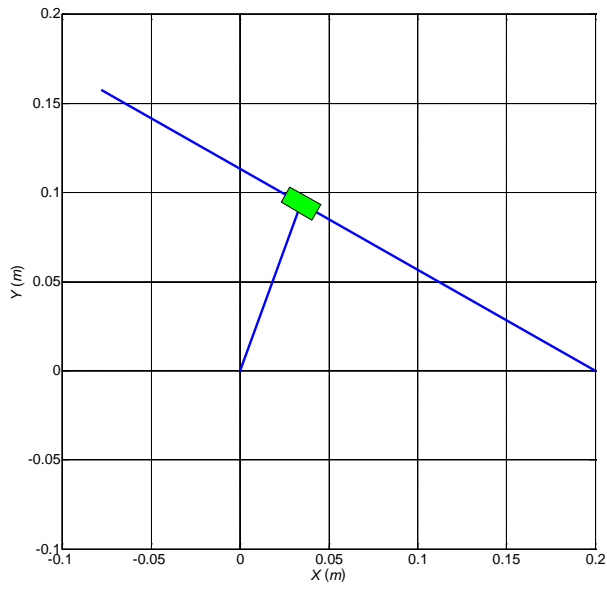
Four-Bar Mechanism



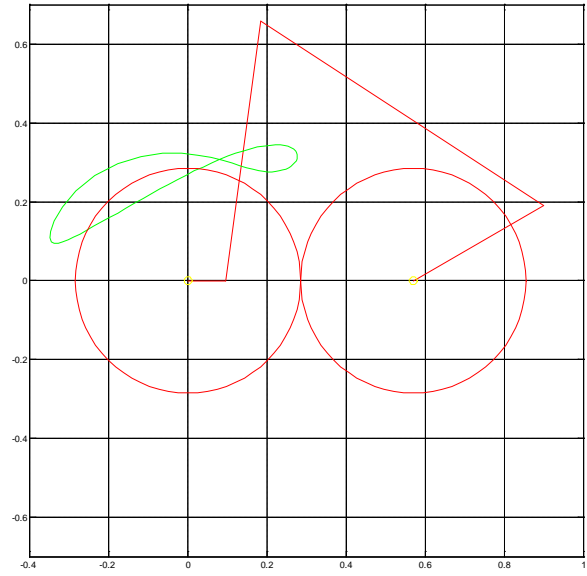
Four-Bar Mechanism Coupler Curve



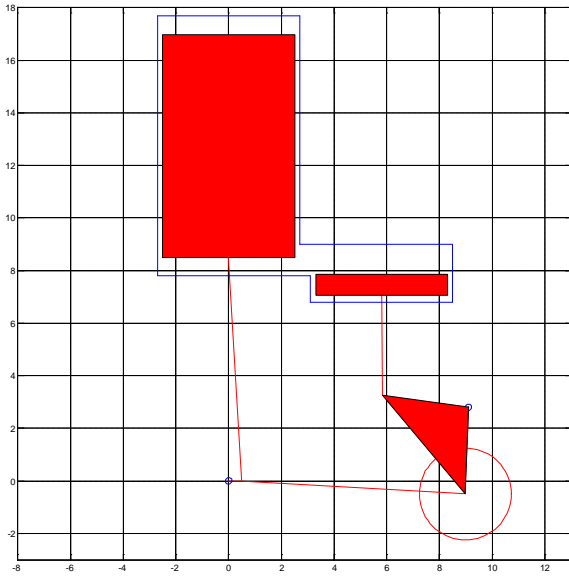
Slider-Crank Mechanism



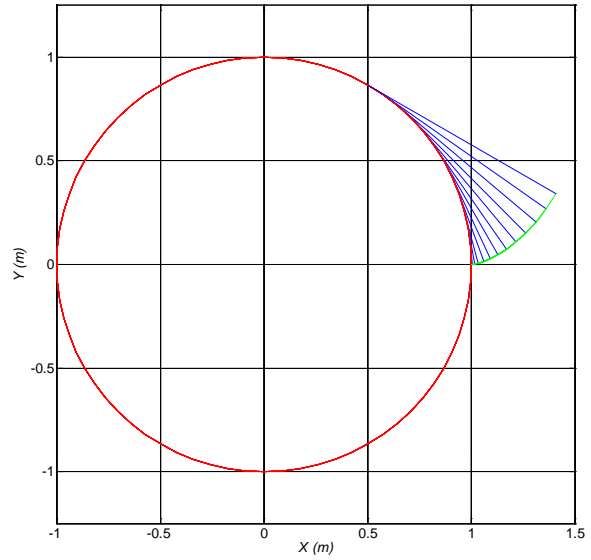
Slider-Crank Mechanism, Inversion 2



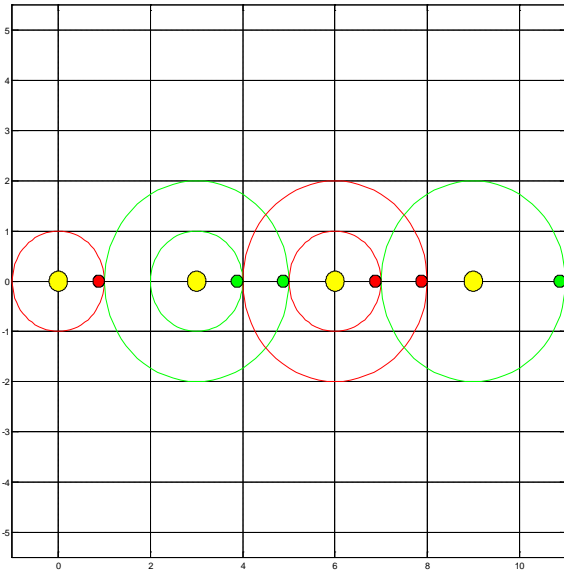
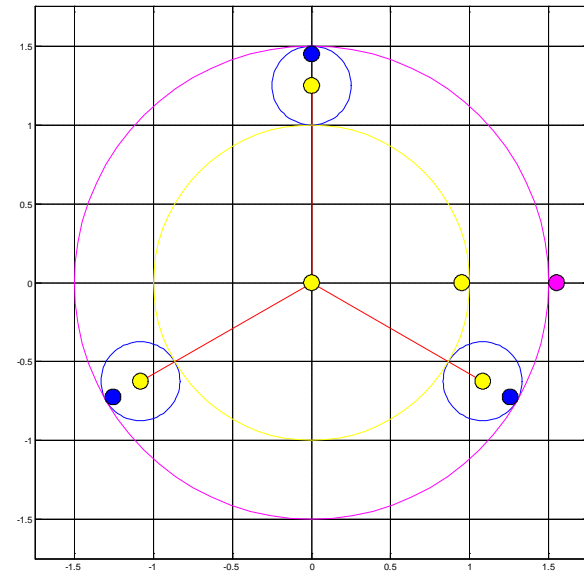
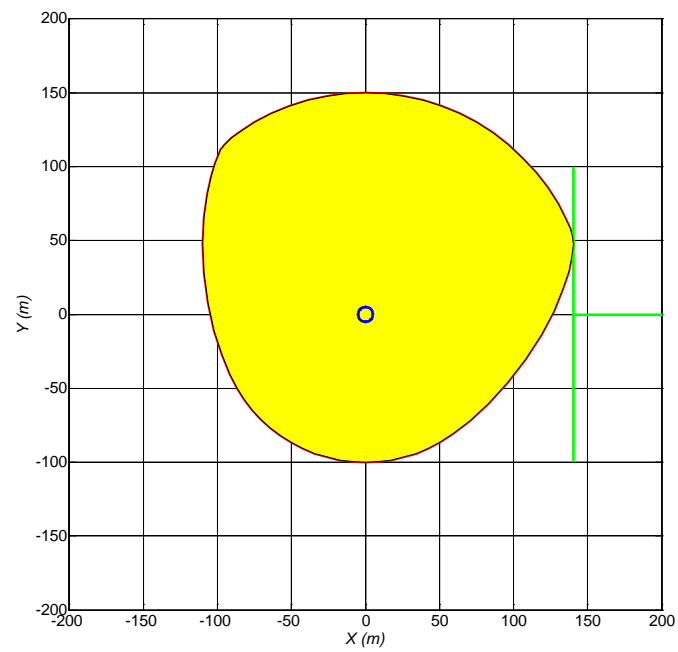
Geared Five-Bar Mechanism

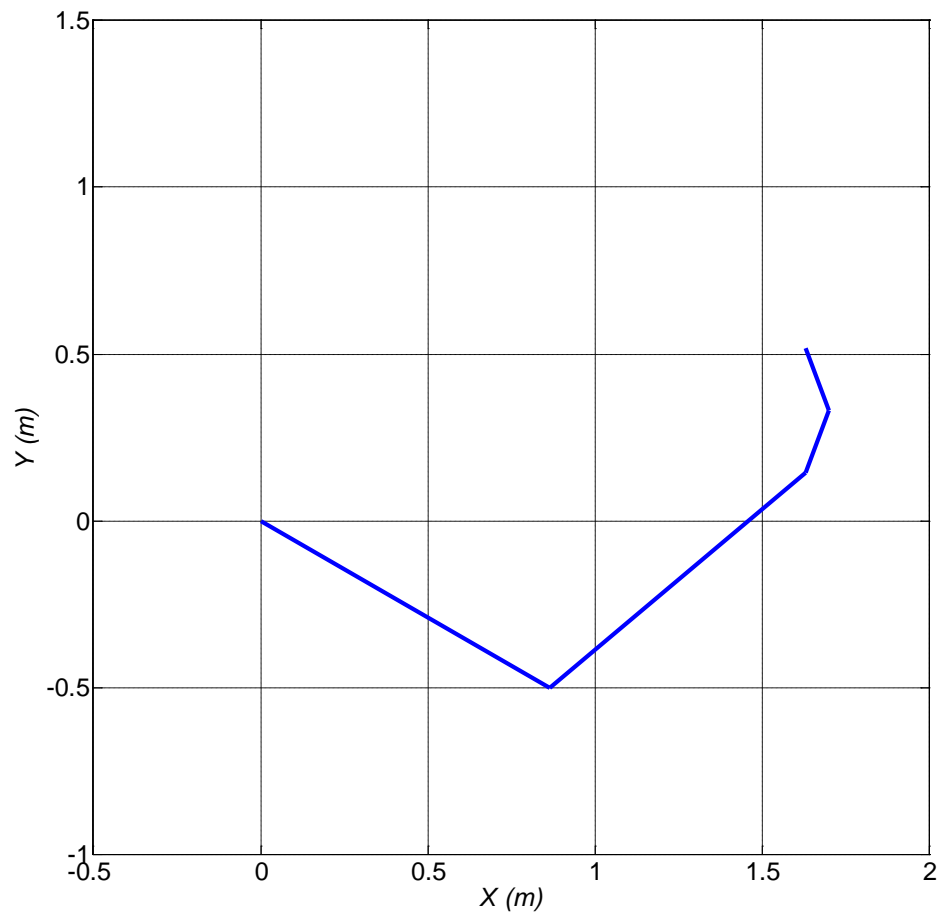


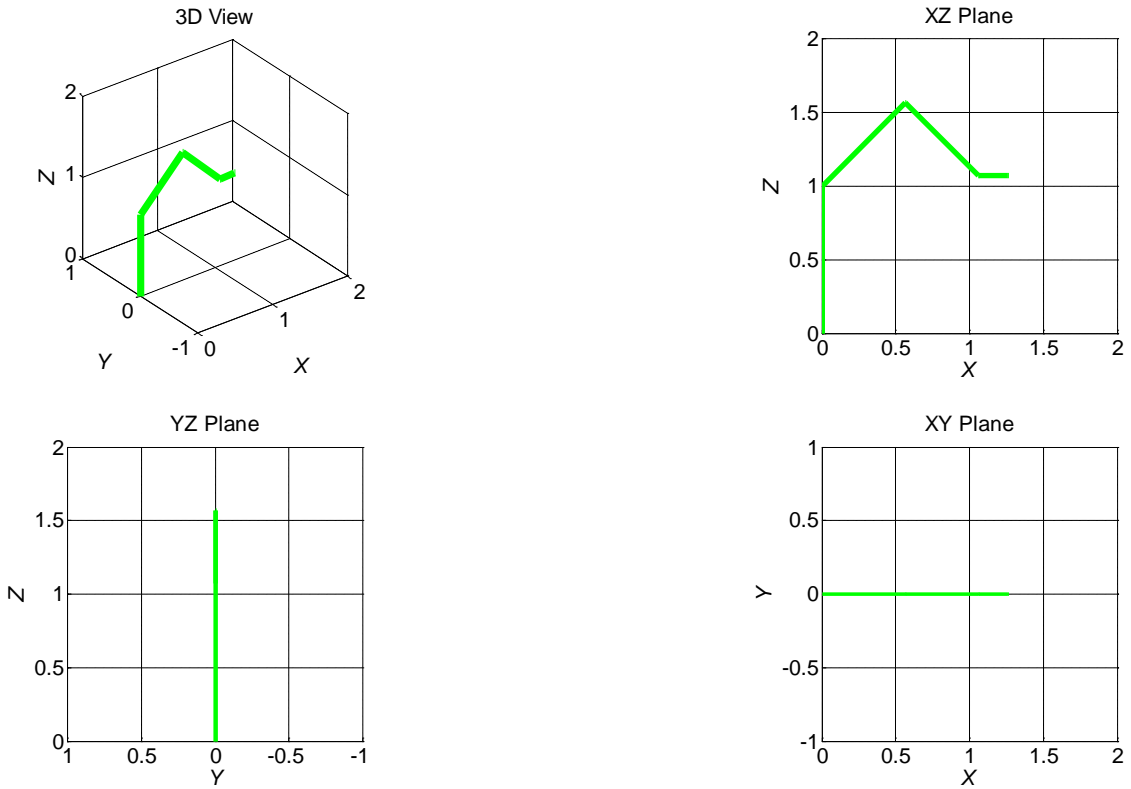
Ross-Yoke Stirling Engine Mechanism



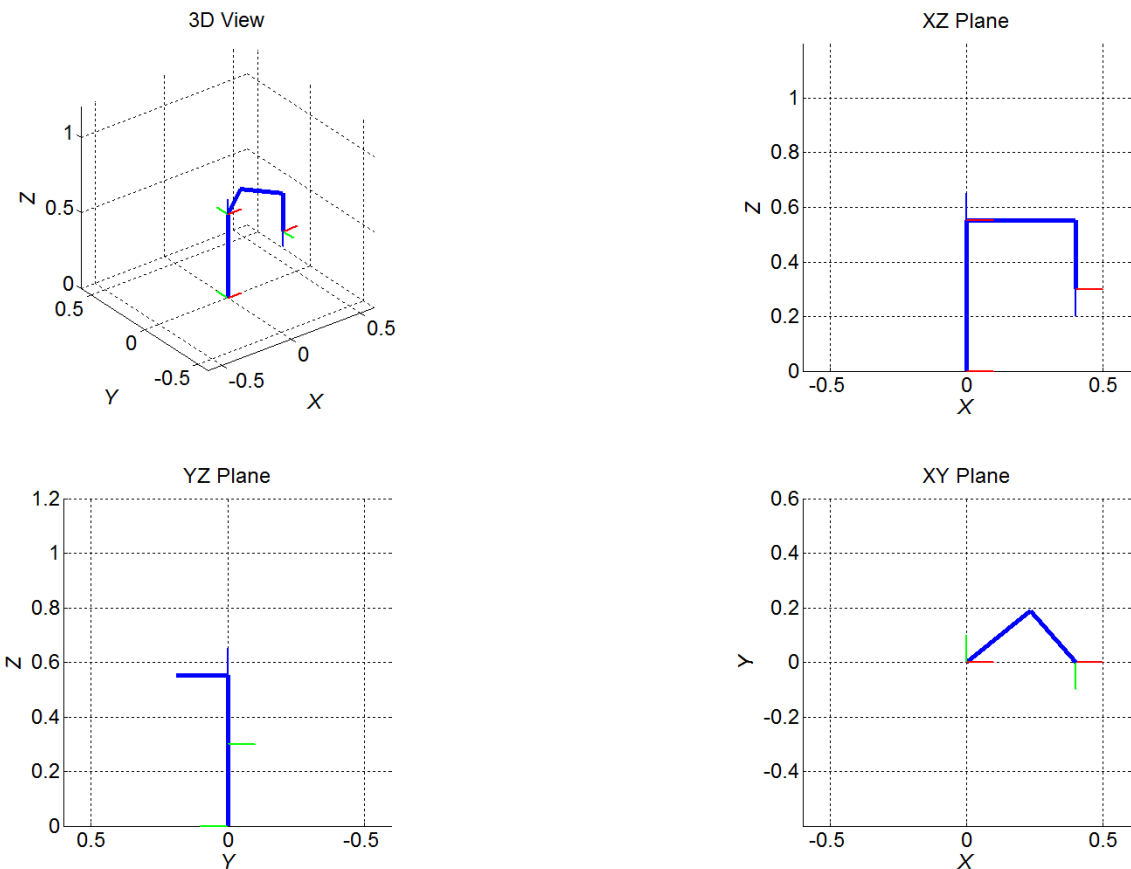
Involute Gear Tooth Construction

**Gearbox Simulation****Planetary Gear Train Simulation****Cam/Follower Animation**

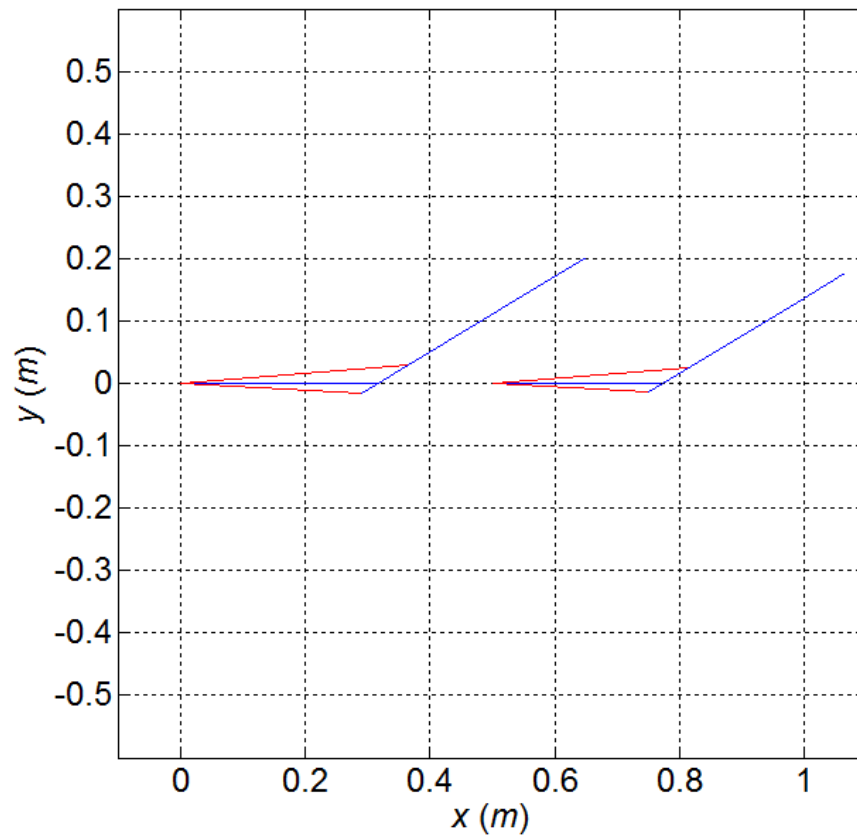
EE/ME 429/529 Mechanics of Robotic Manipulators**Planar 4R Kinematically-Redundant Robot Resolved-Rate Control Simulation**



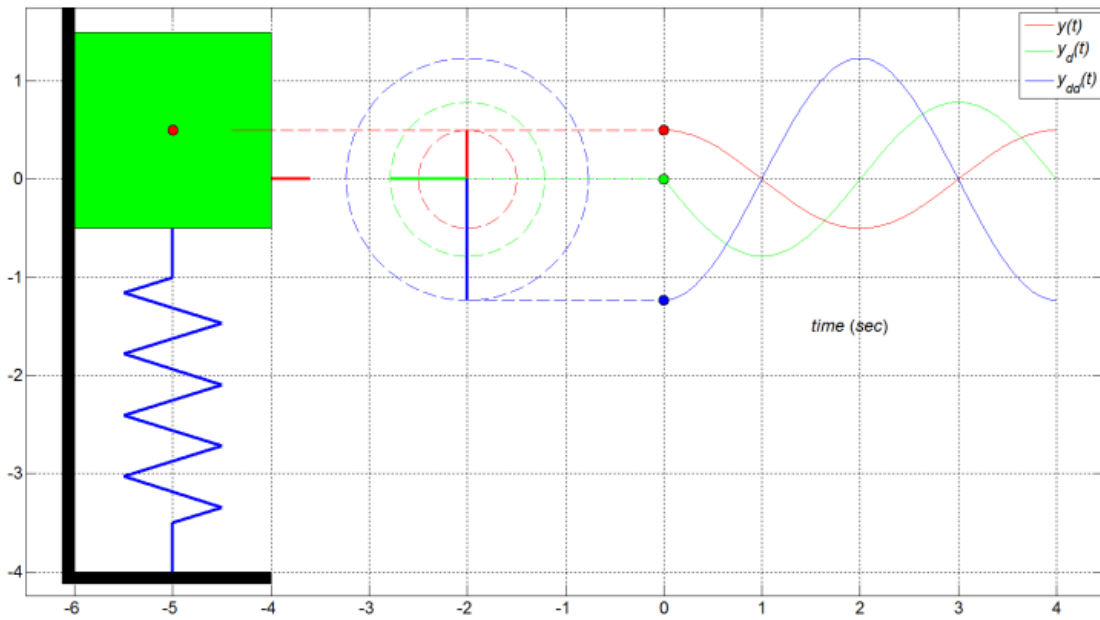
Spatial 4R Kinematically-Redundant Robot Resolved-Rate Control Simulation



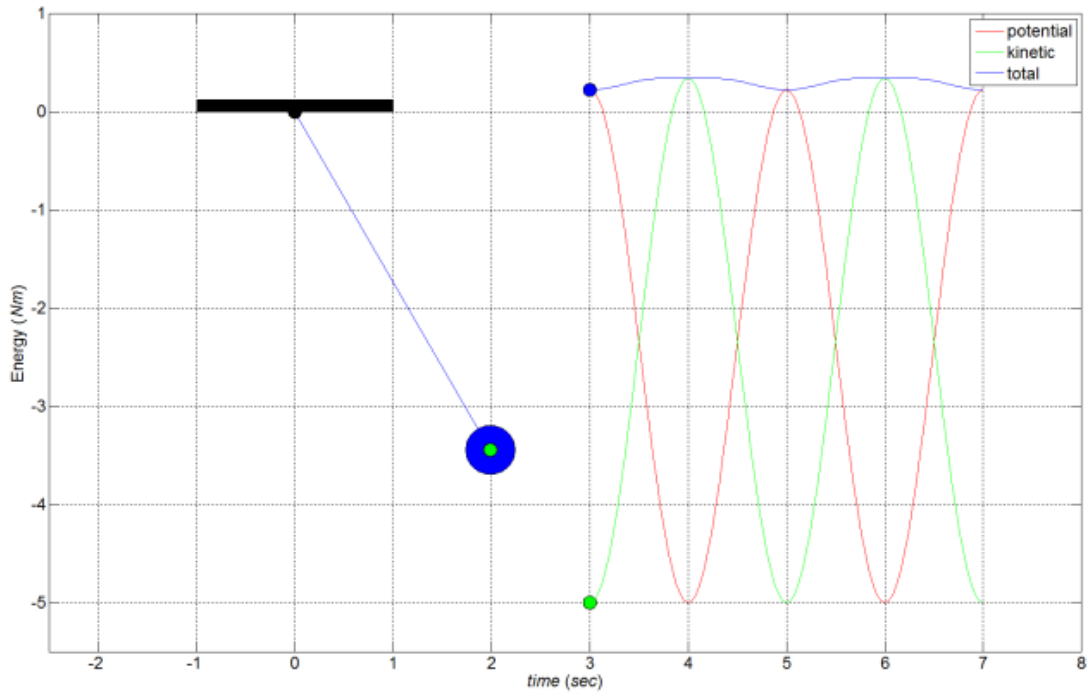
Adept 550 4-dof SCARA Robot MATLAB Simulation/Animation

ME 467 / BME 567 Biomechanics of Human Motion**Human Elbow/Biceps/Triceps Dynamic Simulation (male left, female right)**

ME 491 Mechanical Vibrations



1-dof m-k Vibrational System, Simple Harmonic Motion



1-dof Pendulum Vibrational System, Simple Harmonic Motion