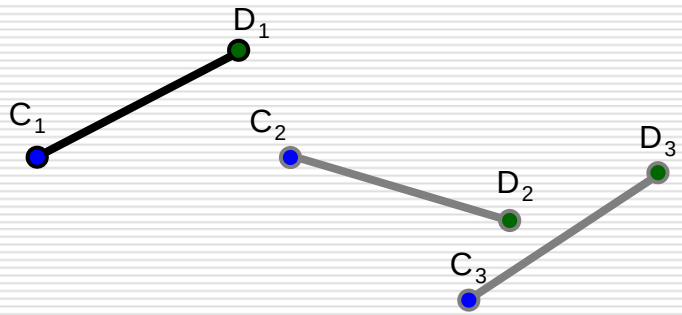
Three Position Graphical Linkage Synthesis

- Three Position
- Three Position with Alternate Moving Pivots
- Three Position with Specified Fixed Pivots

Three Positon Synthesis

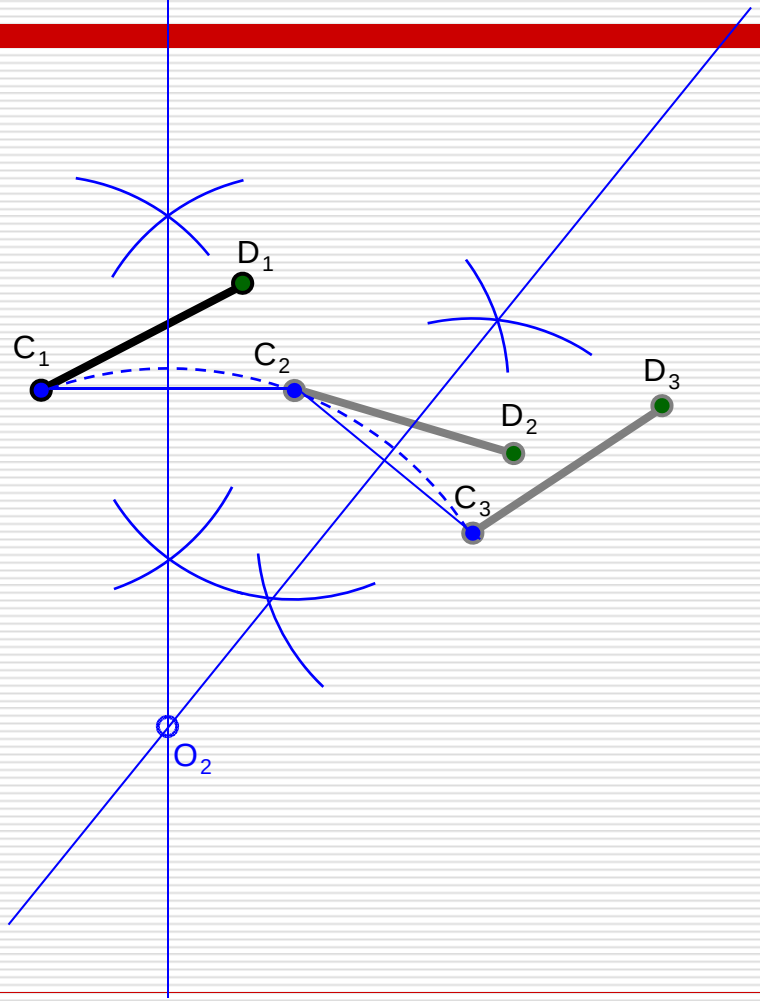


Coupler CD has three desired positions

C_1D_1, C_2D_2, & C_3D_3

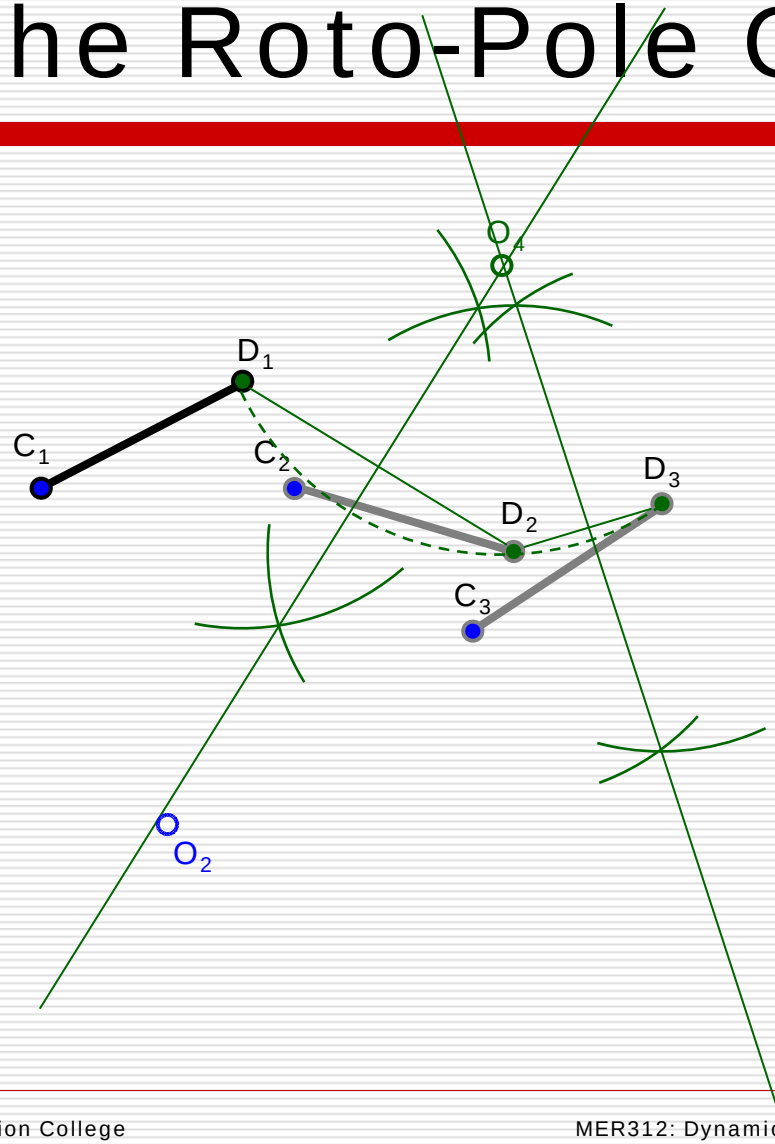
A four bar mechanism needs to be designed to generate this movement

Determining The Location of the Roto-Pole O_2



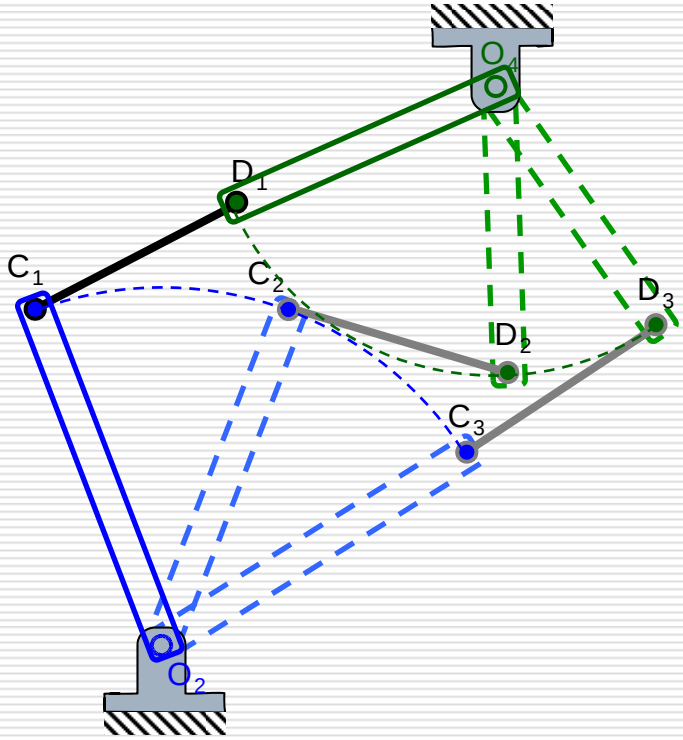
1. Draw Coupler CD in the three desired positions
   a. C_1D_1, C_2D_2, & C_3D_3
2. Draw Construction Lines
   a. C_1C_2, C_2C_3
3. Construct Perpendicular Bisectors
   a. C_1C_2
   b. C_2C_3
4. At the intersection of the Two Perpendicular Bisectors is the Location of the Roto-Pole O_2

Determining The Location of the Roto-Pole O_4



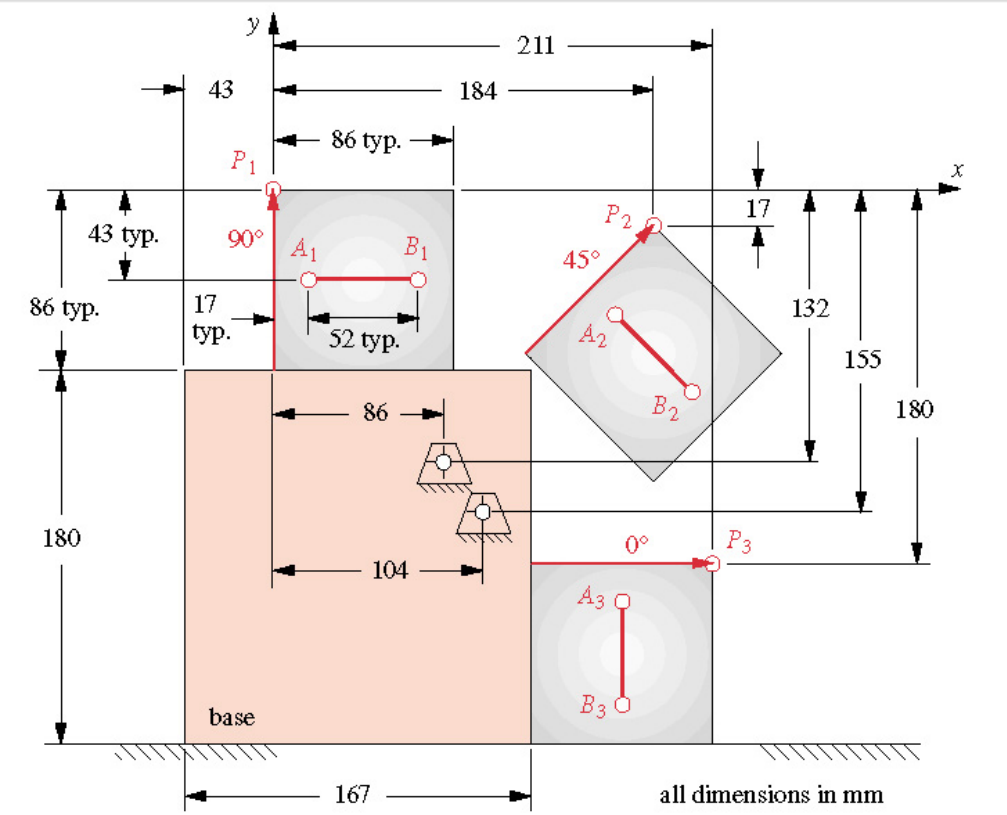
1. Draw Coupler CD in the three desired positions
   a. C_1D_1, C_2D_2, & C_3D_3
2. Draw Construction Lines
   a. D_1D_2, D_2D_3
3. Construct Perpendicular Bisectors
   a. D_1D_2
   b. D_2D_3
4. At the intersection of the Two Perpendicular Bisectors is the Location of the Roto-Pole O_4

Final 4 Bar Synthesis

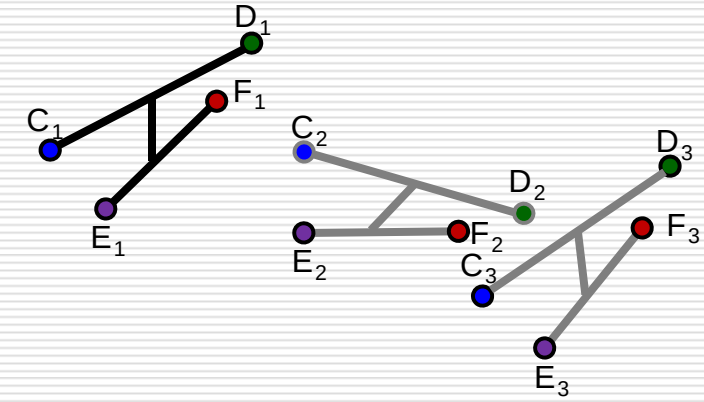


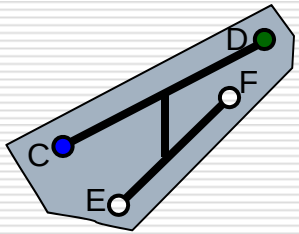
1. O_2 and O_4 are the ground points
2. Draw Link O_2C
3. Draw Link O_4D
4. May want to consider a drive dyad

Example


y
x
211
43
184
86 typ.
P_1
P_2
17
43 typ.
90°
A_1
B_1
45°
86 typ.
17
typ.
52 typ.
132
155
180
A_2
B_2
86
180
104
0°
P_3
A_3
B_3
base
167
all dimensions in mm

Three Positon Synthesis with ALTERNATE PIVOTS

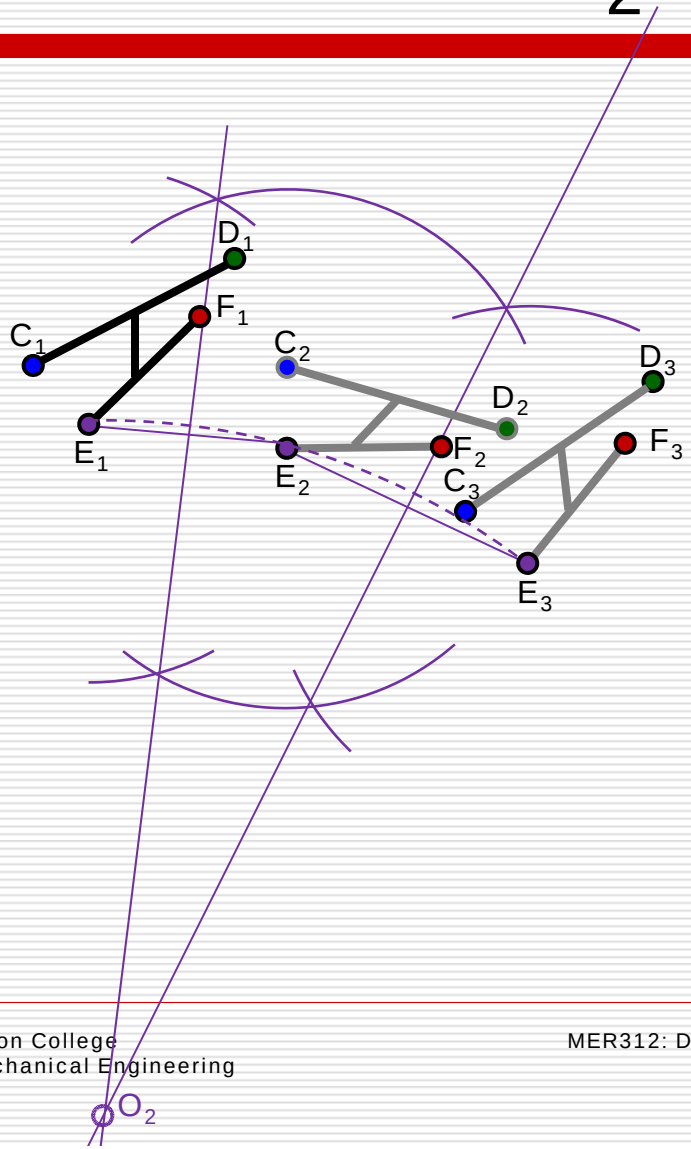




The situation may come up that the mechanism synthesized does not meet the design requirements. It is still required that C_1D_1, C_2D_2, & C_3D_3 have the three positions specified.

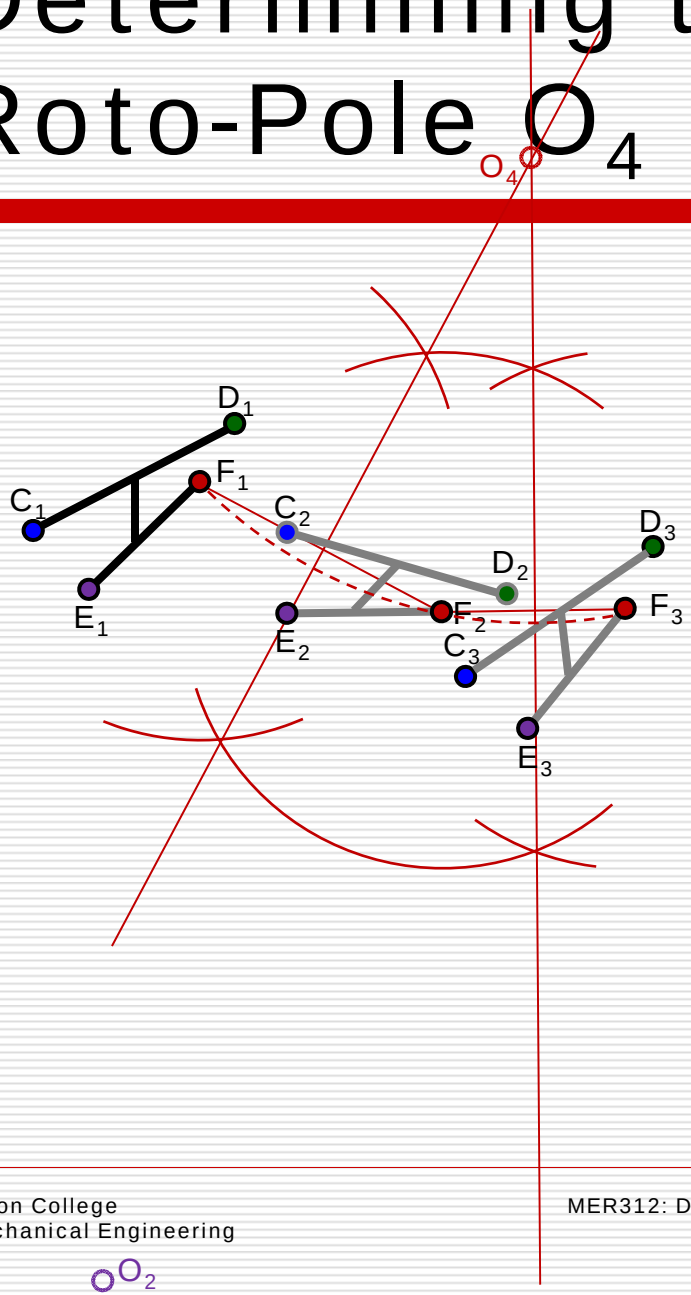
The ALTERNATE PIVOTS E_1F_1, E_2F_2, & E_3F_3 are now considered.

Determining the Location of Roto-Pole O_2



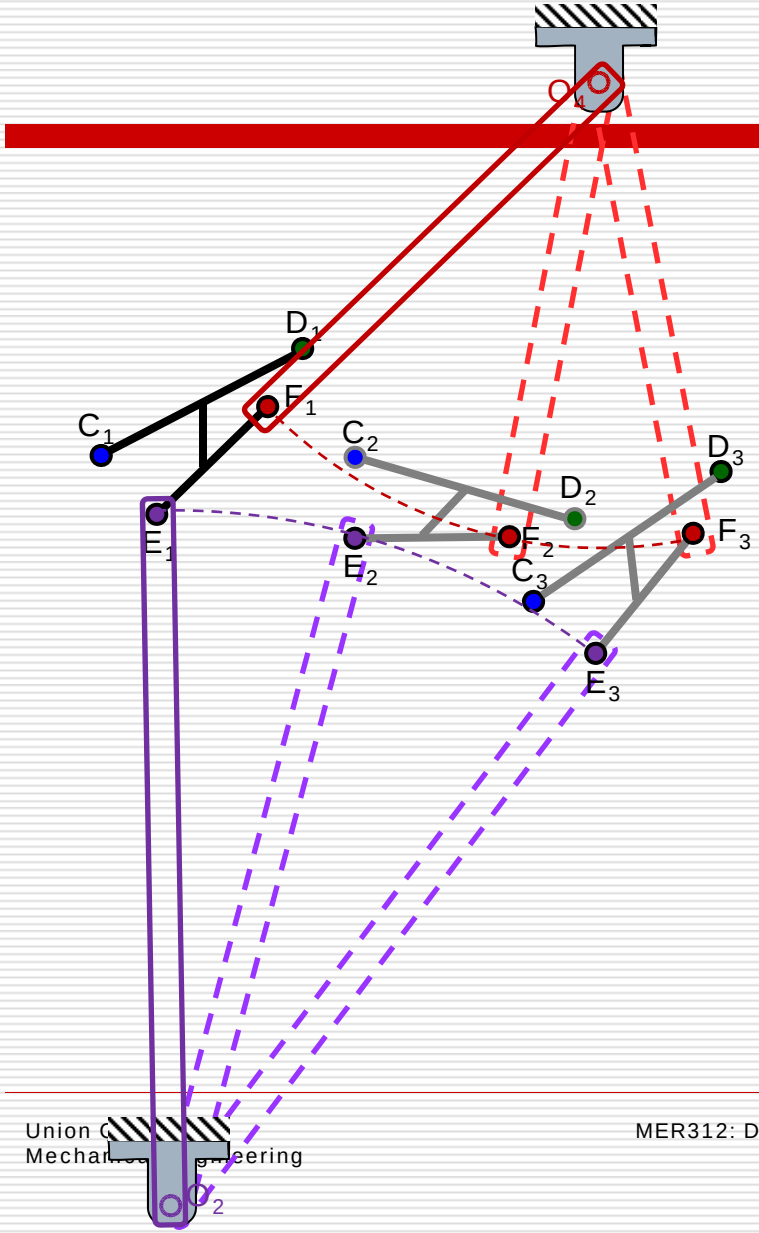
1. Draw Coupler EF in the three desired positions
   a. E_1F_1, E_2F_2, & E_3F_3
2. Draw Construction Lines
   a. E_1E_2, E_2E_3
3. Construct Perpendicular Bisectors
   a. E_1E_2
   b. E_2E_3
4. At the intersection of the Two Perpendicular Bisectors is the Location of the Roto-Pole O_2

Determining the Location of Roto-Pole O_4



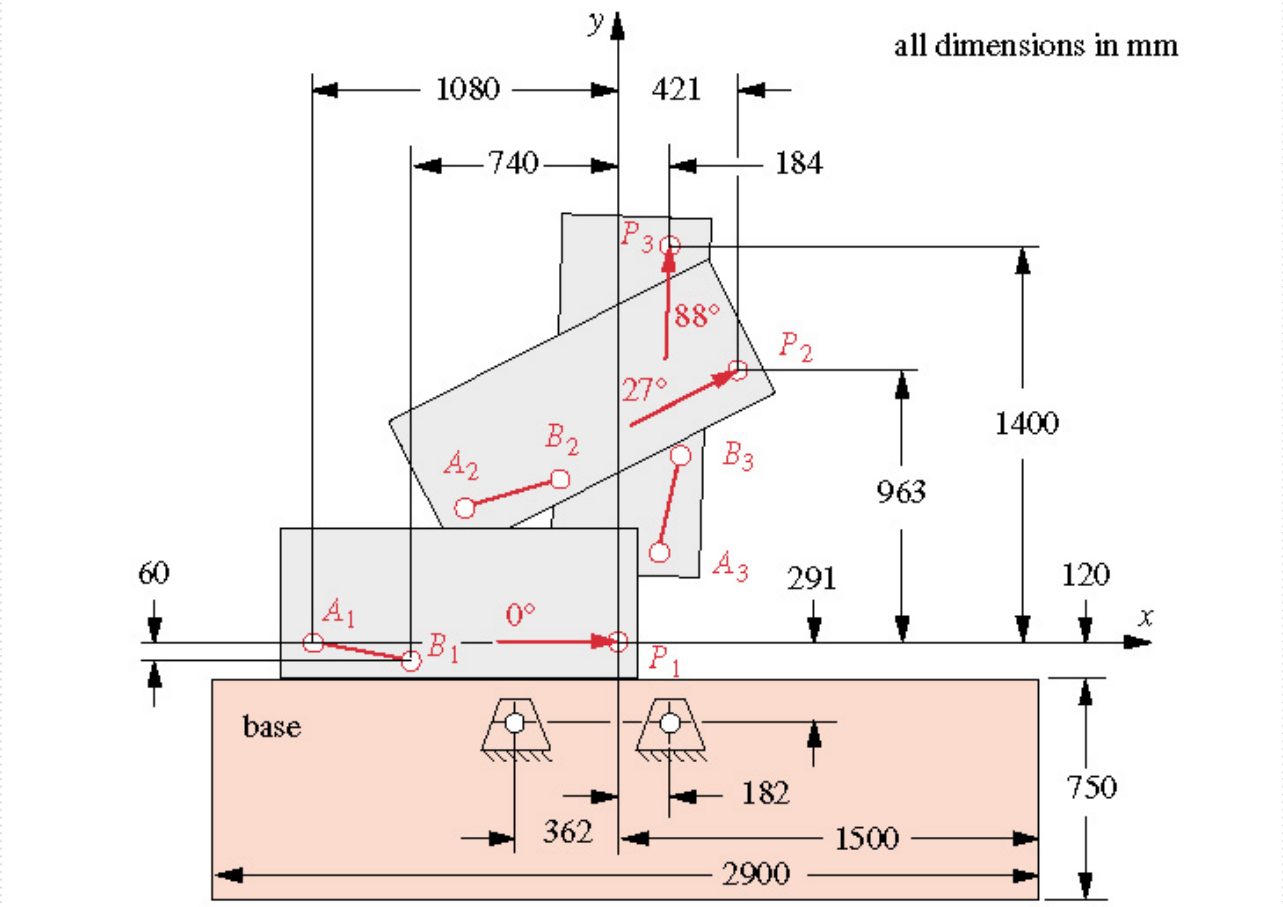
1. Draw Coupler EF in the three desired positions
   a. E_1F_1, E_2F_2, & E_3F_3
2. Draw Construction Lines
   a. F_1F_2, F_2F_3
3. Construct Perpendicular Bisectors
   a. F_1F_2
   b. F_2F_3
4. At the intersection of the Two Perpendicular Bisectors is the Location of the Roto-Pole O_4

Final 4 Bar Synthesis



1. O_2 and O_4 are the ground points
2. Draw Link O_2E
3. Draw Link O_4F
4. May want to consider a drive dyad

Example


y
all dimensions in mm
1080
421
740
184
P_3
88°
P_2
27°
1400
963
A_2
B_2
B_3
A_3
60
291
120
x
A_1
B_1
0°
P_1
base
182
750
362
1500
2900