PROBLEM 3-39

Statement: Find the Grashof condition, any limit positions, and the extreme values of the transmission angle (to graphical accuracy) of the linkage in Figure P3-11.

Given: Link lengths: Link 2 $L_2 := 0.86$ Link 3 $L_3 := 1.85$

Link 4 $L_4 := 0.86$ Link 1 $L_1 := 2.22$

Grashof condition function:

$$Condition(S, L, P, Q) := \left| \begin{array}{l} SL \leftarrow S + L \\ PQ \leftarrow P + Q \\ return \text{ "Grashof" } if \ SL \leq PQ \\ return \text{ "non-Grashof" } otherwise \end{array} \right.$$

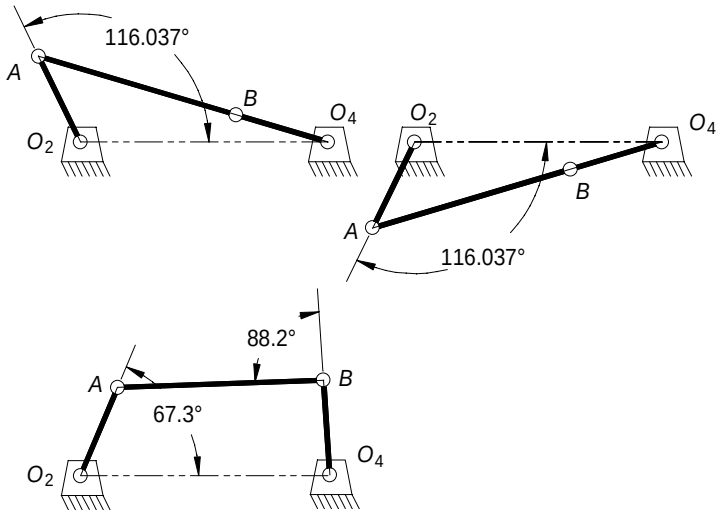
Solution: See Figure P3-11 and Mathcad file P0339.

1. Determine the Grashof condition of the mechanism from inequality 2.8 and its Barker classification from Table 2-4.

   Grashof condition: $Condition\left(L_2, L_1, L_3, L_4\right)$ = "non-Grashof"

   Barker classification: Class II-1, non-Grashof triple rocker, RRR1, since the longest link is the ground link.

2. An RRR1 linkage will have two toggle positions. Draw the linkage in these two positions and measure the input link angles.



3. As measured from the layout, the input link angles at the toggle positions are: +116 and -116 deg.

4. Since the coupler link in an RRR1 linkage it cannot make a full rotation with respect to the input and output rockers, the minimum transmission angle is 0 deg and the maximum is 88 deg.