Homework #10

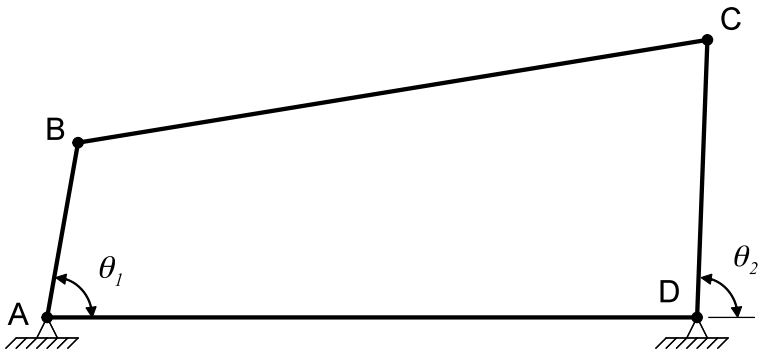
Cut and paste Matlab output into a Word document. Make sure the assignment has your name on the first page.

1. Problem 8.11 on page 310

2. Problem 8.23 on page 314

3. Motion of a four-bar linkage

   A four-bar linkage is illustrated in the figure below. Such linkages are designed by mechanical engineers to transmit mechanical movement in various ways.



   Member AD is anchored to a supporting base and does not move. Member AB rotates about point A, resulting in a reciprocating movement of members BC and CD. All motion is in the plane of the page. Therefore, angle θ_2 changes in response to a change in angle θ_1. This motion is therefore constrained by the equation

$$\overline{AD} = \overline{AB}\cos\theta_1 - \overline{CD}\cos\theta_2 + \sqrt{\overline{BC}^2 - \left(\overline{CD}\sin\theta_2 - \overline{AB}\sin\theta_1\right)^2}$$

   Suppose $\overline{AB} = 1.5\ m$, $\overline{BC} = 6\ m$, $\overline{CD} = 3.5\ m$, and $\overline{AD} = 5\ m$.

   Set up a Matlab function to determine angle θ_2, given a value of angle θ_1, for example, 45°. In your function, use a Matlab solver function, such as **fzero** or **fsolve**.

   Create an m-file script that carries out a case study of θ_2 versus θ_1. Your m-file should create a graph of this relationship.