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EMT 2336: Dynamics of Planar Mechanisms - Laboratory Work 2

Question

The striking mechanism of a weaving machine consists of a four bar linkage. In a particular case, such a linkage is required to coordinate five positions of the rocker follower with five positions of the input crank as shown in the Table 1. The length of the fixed link is required to be $180mm$.

Table 1:

S/NO.	Input angle, θ_2	Input angle, θ_4
1.0	40^0	70^0
2.0	45^0	76^0
3.0	50^0	83^0
4.0	55^0	91^0
5.0	60^0	100^0

Write a computer program in MATLAB to,

(a) Evaluate K_1, K_2 and K_3 using the least square method, and hence determine the length of the other links

(b) Calculate the transmission angles for the given range of input angles and at an increment of 1^0, and plot a curve of the transmission angles against the input angles for the given range. Comment on the quality of transmission of the linkage.

(c) Calculate the structural errors throughout the given range of input angles and at an increment of 1^0. Plot a curve of the structural error against the input angles for the given range, and hence comment on the resulting error.