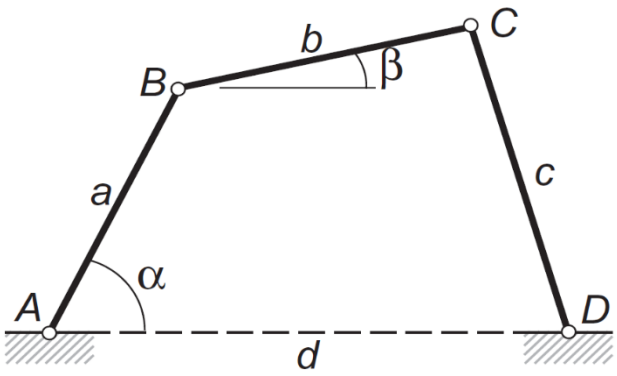
Calculus: Linkage Velocities

A three-bar linkage has dimensions $a = 0.1\ m, b = 0.12\ m, c = 0.15\ m$, and $d = 0.18\ m$. It can be shown through geometry that the relationship between angles α and β is:

$$(d - a\cos(\alpha) - b\cos(\beta))^2 + (a\sin(\alpha) + b\sin(\beta))^2 = 0$$



a) Determine the β values when $\alpha = 0°: 5°: 30°$.

b) If link AB rotates with constant angular velocity $\omega_{AB} = 25\frac{rad}{s}$, tabulate ω_{BC} against α. Note that $\omega_{BC} = \left(\frac{d\beta}{d\alpha}\right)\omega_{AB}$.