Path Generation

The objective of this analysis is to design a 4-bar mechanism that possesses a point that will trace out a specified path.

In the path generation synthesis problem, R1, R2, and R3 are given, and β2 and β3 are given. The engineer needs to determine coupler motion angles, α2, and α3, as well as the magnitudes and directions of the left and right dyad vectors (**W,Z, W* and Z***).

Now, instead of expanding around column 1 (motion generation), we will expand about column 2 and proceed with exactly the same type of approach as before.

$$\begin{bmatrix} 1 & 1 & \vec{R}_1 \\ e^{i\beta_2} & e^{i\alpha_2} & \vec{R}_2 \\ e^{i\beta_3} & e^{i\alpha_3} & \vec{R}_3 \end{bmatrix} \begin{Bmatrix} \vec{W} \\ \vec{Z} \\ -1 \end{Bmatrix} = \{\vec{0}\}$$

$$\left(\vec{R}_3 e^{i\beta_2} - \vec{R}_2 e^{i\beta_3}\right) - e^{i\alpha_2}\left(\vec{R}_3 - e^{i\beta_3}\vec{R}_1\right) + e^{i\alpha_3}\left(\vec{R}_2 - e^{i\beta_2}\vec{R}_1\right) =$$
$$\left(\vec{R}_3 e^{i\beta_2} - \vec{R}_2 e^{i\beta_3}\right) + e^{i\alpha_2}\left(-\vec{R}_3 + e^{i\beta_3}\vec{R}_1\right) + e^{i\alpha_3}\left(\vec{R}_2 - e^{i\beta_2}\vec{R}_1\right)$$

Determine closed form solutions for α2 and α3.

Set up equations to find **W** and **Z.**

How will you solve for right dyad components?