Linkage bars animations

Linkage Bars

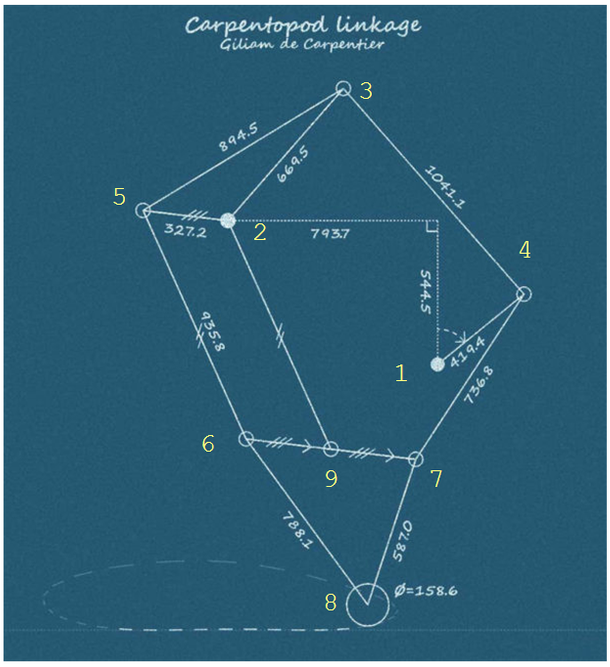
Examples

$\text{Clear}(N, t, \tau, x, y, z, \theta, \omega) = 1$

Caprentoid Liknage

https://en.smath.com/forum/yaf_postsm85919_Draghilev-method-revisited.asp

https://www.decarpentier.nl/carpentopod



$$\left[k_{14} := 419.4 \quad k_{23} := 669.5 \quad k_{25} := 327.2 \right]$$

$$\left[k_{34} := 1041.1 \quad k_{35} := 894.5 \quad k_{47} := 736.8 \right]$$

$$\left[k_{56} := 935.8 \quad k_{68} := 788.1 \quad k_{78} := 587 \right]$$

$$E := \begin{bmatrix} 1 & 2 & 2 & 2 & 3 & 3 & 4 & 5 & 6 & 6 & 7 & 7 \\ 4 & 3 & 5 & 9 & 4 & 5 & 7 & 6 & 8 & 9 & 8 & 9 \\ k_{14} & k_{23} & k_{25} & k_{56} & k_{34} & k_{35} & k_{47} & k_{56} & k_{68} & k_{25} & k_{78} & k_{25} \end{bmatrix}$$

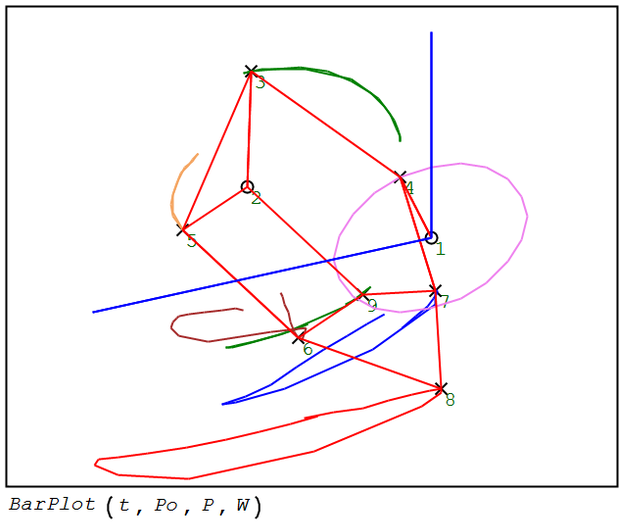
$$\left[a \quad b \right] := \left[797.7 \quad 544.5 \right]$$

$$\left[Po := \begin{bmatrix} 0 & 0 & 0 \\ a & 0 & b \end{bmatrix} \quad Pg := \begin{bmatrix} 0.5 \cdot a & 0 & b + 0.5 \cdot k_{23} \\ -0.5 \cdot k_{14} & 0 & 0.5 \cdot b \\ a + k_{25} & 0 & b \\ 2 \cdot k_{25} & 0 & -0.5 \cdot k_{56} \\ 0 & 0 & -0.5 \cdot k_{56} \\ k_{25} & 0 & -0.5 \cdot \left(k_{56} + k_{68} \right) \\ k_{25} & 0 & -0.5 \cdot k_{56} \end{bmatrix} \right]$$

$$\left[N := 20 \quad n := \left[1 .. (N+1) \right] \quad \theta o := pR(360\ °, 0\ °, N) \right]$$

$$BarE(\theta, x, y, z) := \left[BarR(\theta, x_4, z_4) \right]$$

$$\left[P \quad W \right] := BarPW(\theta o, E, Po, Pg, \text{"J"})$$



$BarPlot(t, Po, P, W)$

Jansen's linkage

Jansen's linkage

It is a planar leg mechanism. Here we use the option "J" for the solver.
Values are from https://github.com/cvigoe/Jansen/blob/master/jansen.pdf

$$N := 40 \quad n := [1..(N+1)] \quad \theta o := pR(0\,°, 360\,°, N)$$

$$k_{32} := 4.15 \quad k_{27} := 3.93 \quad k_{25} := 4.01 \quad k_{35} := 5.58$$

$$k_{56} := 3.94 \quad k_{67} := 3.67 \quad k_{68} := 6.57 \quad k_{78} := 4.90$$

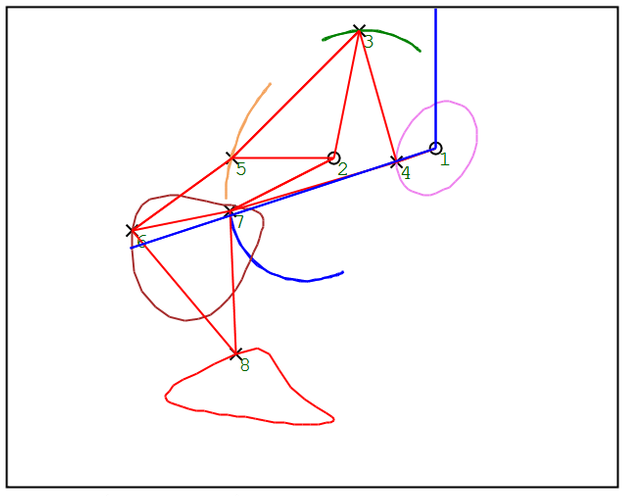
$$k_{34} := 5.00 \quad k_{47} := 6.19 \quad k_{14} := 1.50 \quad \lambda := 0.78 \quad a := 3.80$$

$$Po := \begin{bmatrix} 0 & 0 & 0 \\ a & 0 & \lambda \end{bmatrix} \quad Pg := \begin{bmatrix} k_{14} & 0 & k_{34} \\ -k_{34} & 0 & 0 \\ a + k_{25} & 0 & \lambda \\ a + k_{25} & 0 & -\lambda \\ a & 0 & -k_{27} \\ a + k_{25} & 0 & -(k_{27} + k_{78}) \end{bmatrix}$$

$$E := \begin{bmatrix} 2 & 4 & 4 & 3 & 3 & 2 & 5 & 6 & 6 & 7 & 1 \\ 5 & 3 & 7 & 2 & 5 & 7 & 6 & 7 & 8 & 8 & 4 \\ k_{25} & k_{34} & k_{47} & k_{32} & k_{35} & k_{27} & k_{56} & k_{67} & k_{68} & k_{78} & k_{14} \end{bmatrix}$$

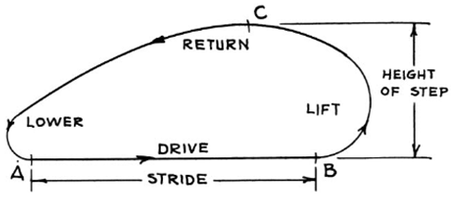
$$BarE(\theta, x, y, z) := [BarR(\theta, x_4, z_4)]$$

$$[P \; W] := BarPW(\theta o, E, Po, Pg, "J")$$



BarPlot(t, Po, P, W)

Shigley's Phases of the Foot-Path



Alvaro