Circular Rotations:

SIN/COS: ROTATION MODE

- Inputs:
  - $X_0 = \frac{1}{K_{nc}}$
  - $Y_0 = 0$
  - $Z_0 = a$
- Output
  - $X_n = \cos(Z_0)$
  - $Y_n = \sin(Z_0)$
  - $Z_n = 0$

Arctan/magnitude: VECTORING MODE

- Inputs
  - $X_0 = a$
  - $Y_0 = a$
  - $Z_0 = 0$
- Outputs
  - $X_n = K_{nc}\sqrt{X_0^2 + Y_0^2}$
    - Scale by $\frac{1}{K_{nc}}$ to get magnitude
  - $Y_n = 0$
  - $Z_n = \arctan(\frac{Y_0}{X_0})$

Linear Rotations:

MULT: ROTATION MODE

- Inputs:
  - $X_0 = a$
  - $Y_0 = 0$
  - $Z_0 = b$
- Outputs:
  - $X_n = X_0$
  - $Y_n = X_0 Z_0$
  - $Z_n = 0$

DIV: VECTORING MODE

- Inputs:
  - $X_0 = a$
  - $Y_0 = b$
  - $Z_0 = 0$
- Outputs:
  - $X_n = X_0$
  - $Y_n = 0$
  - $Z_n = Y_0 / X_0$

Hyperbolic Rotations:

COSH/SINH: ROTATION MODE

- Inputs:
  - $X_0 = \frac{1}{K_{nh}}$
  - $Y_0 = 0$
  - $Z_0 = a$
- Outputs:
  - $X_n = \cosh(Z_0)$
  - $Y_n = \sinh(Z_0)$
  - $Z_n = 0$
  - $e^{Z_0} = \sinh(Z_0) + \cosh(Z_0)$

ARCTANH/SQRT: VECTORING MODE

- Inputs:
  - $X_0 = a + \frac{1}{4}$
  - $Y_0 = a - \frac{1}{4}$
  - $Z_0 = 0$
- Outputs:
  - $X_n = K_{nh}\sqrt{a}$
    - Scale by $\frac{1}{K_{nh}}$ to get $\sqrt{a}$
  - $Y_n = 0$
  - $Z_n = \operatorname{arctanh}(\frac{Y_0}{X_0})$

LN: VECTORING MODE

- Inputs:
  - $X_0 = a + 1$
  - $Y_0 = a - 1$
  - $Z_0 = 0$
- Outputs:
  - $X_n = K_{nh}\sqrt{X_0^2 - y_0^2}$
  - $Y_n = 0$
  - $Z_n = \operatorname{arctanh}\left(\frac{Y_0}{X_0}\right)$
  - $\ln(a) = 2\operatorname{arctanh}(\frac{Y_0}{X_0})$