

# Modsim cheat sheet

## Simple Rotations

$$R_x(\theta) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos(\theta) & -\sin(\theta) \\ 0 & \sin(\theta) & \cos(\theta) \end{bmatrix}$$

$$R_y(\theta) = \begin{bmatrix} \cos(\theta) & 0 & \sin(\theta) \\ 0 & 1 & 0 \\ -\sin(\theta) & 0 & \cos(\theta) \end{bmatrix}$$

$$R_z(\theta) = \begin{bmatrix} \cos(\theta) & -\sin(\theta) & 0 \\ \sin(\theta) & \cos(\theta) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

## Positive Real

$H(s)$  positive real iff

1. No poles with real part  $> 0$
2.  $H(s)$  real for all positive and real  $s$
3.  $\operatorname{Re}[H(s)] \geq 0$  for all  $\operatorname{Re}[s] > 0$ .