

$$A = \frac{1}{2} \begin{bmatrix} -M_{E1} \\ M_{E1} \\ -M_{E1} \\ M_{E1} \end{bmatrix}$$

$$b = \begin{bmatrix} -\frac{h\ddot{\theta}}{2} + \frac{R}{L}\tau_0 - 60 \\ \frac{h\ddot{\theta}}{2} - \frac{R}{L}\tau_0 - 60 \\ -\frac{h\ddot{\theta}}{2} - \frac{R}{L}\tau_0 - 60 \\ \frac{h\ddot{\theta}}{2} + \frac{R}{L}\tau_0 - 60 \end{bmatrix}$$

Right wheel

$$-60 < \tau_R < 60$$

$$-60 < \frac{+R\tau_0}{L} - \frac{\tau_1}{2} < 60$$

$$(1) -\frac{\tau_1}{2} + \frac{R\tau_0}{L} < 60 \Leftrightarrow -\frac{1}{2}(M_{E1}\ddot{q} + h\ddot{\theta}) + \frac{R\tau_0}{L} - 60 < 0$$

$$(2) -\frac{\tau_1}{2} + \frac{R\tau_0}{L} > -60 \Leftrightarrow -\frac{1}{2}M_{E1}\ddot{q} - \frac{h\ddot{\theta}}{2} + \frac{R\tau_0}{L} - 60 < 0$$

$$\frac{\tau_1}{2} - \frac{R\tau_0}{L} < 60 \Leftrightarrow \frac{1}{2}(M_{E1}\ddot{q} + h\ddot{\theta}) - \frac{R\tau_0}{L} - 60 < 0$$

$$\frac{1}{2}M_{E1}\ddot{q} + \frac{h\ddot{\theta}}{2} - \frac{R\tau_0}{L} - 60 < 0$$

Left wheel

$$-60 < -\frac{R\tau_0}{L} - \frac{\tau_1}{2} < 60$$

$$(3) -\frac{\tau_1}{2} - \frac{R\tau_0}{L} < 60 \Leftrightarrow -\frac{1}{2}M_{E1}\ddot{q} - \frac{h\ddot{\theta}}{2} - \frac{R\tau_0}{L} - 60 < 0$$

$$(4) -\frac{\tau_1}{2} - \frac{R\tau_0}{L} > -60 \Leftrightarrow$$

$$\frac{\tau_1}{2} + \frac{R\tau_0}{L} < 60 \Leftrightarrow \frac{1}{2}M_{E1}\ddot{q} + \frac{h\ddot{\theta}}{2} + \frac{R\tau_0}{L} - 60 < 0$$

Previously

$$-\tau_{lin} < \tau < \tau_{lin} \Leftrightarrow -\tau_{lin} < M\ddot{q} + h < \tau_{lin}$$

~~$\tau < \tau_{lin}$~~

$$M\ddot{q} + h > -\tau_{lin}$$

$$M\ddot{q} + h < \tau_{lin}$$

$$-M\ddot{q} - h < \tau_{lin}$$

$$M\ddot{q} + h - \tau_{lin} < 0$$

$$-M\ddot{q} - h - \tau_{lin} < 0$$

$$\underbrace{\quad}_p \quad \underbrace{\quad}_{-b}$$

$$\underbrace{\quad}_p \quad \underbrace{\quad}_{-b}$$