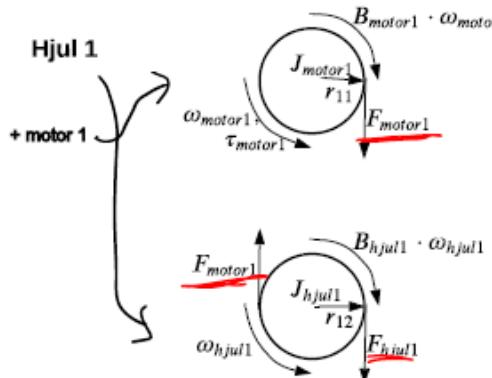
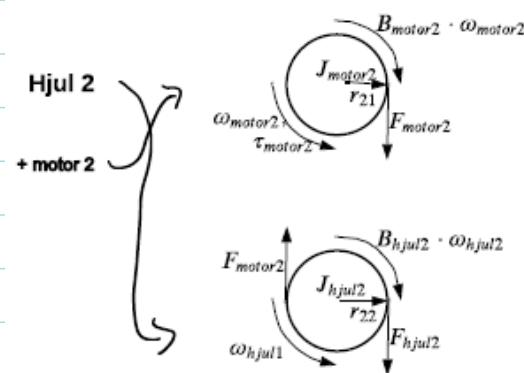


Two systems of differential equations



$$\sum_m \cdot \omega_{m1} = \tau_{m1} - F_{m1} \cdot r_{11} - B_{m1} \cdot \omega_{m1}$$

input **output**



$$\sum_m \cdot \omega_{m2} = \tau_{m2} - F_{m2} \cdot r_{21} - B_{m2} \cdot \omega_{m2}$$

input **output**

$$\sum_h \cdot \omega_{h2} = F_{m2} \cdot r_{21} - F_{h2} \cdot r_{22} - B_{h2} \cdot \omega_{h2}$$

input **output**

Omställning:

$$(1) \quad \underline{\tau_{m1}} - \sum_m \cdot \omega_{m1} - B_{m1} \cdot \omega_{m1} = \underline{F_{m1} \cdot r_{11}}$$

$$\underline{F_{m1} \cdot r_{11}} - \sum_h \cdot \omega_{h1} - B_{h1} \cdot \omega_{h1} = \underline{F_{h1} \cdot r_{12}}$$

$$(\underline{\tau_{m1}} - \sum_m \cdot \omega_{m1} - B_{m1} \cdot \omega_{m1}) - \sum_h \cdot \omega_{h1} - B_{h1} \cdot \omega_{h1} = \underline{F_{h1} \cdot r_{12}}$$

$$(2) \quad \underline{\tau_{m2}} - \sum_m \cdot \omega_{m2} - B_{m2} \cdot \omega_{m2} = \underline{F_{m2} \cdot r_{21}}$$

$$\underline{F_{m2} \cdot r_{21}} - \sum_h \cdot \omega_{h2} - B_{h2} \cdot \omega_{h2} = \underline{F_{h2} \cdot r_{22}}$$

$$(\underline{\tau_{m2}} - \sum_m \cdot \omega_{m2} - B_{m2} \cdot \omega_{m2}) - \sum_h \cdot \omega_{h2} - B_{h2} \cdot \omega_{h2} = \underline{F_{h2} \cdot r_{22}}$$

antage samme friktion? B_m B_n

(1) $(\underline{\tilde{z}_{m1}} - J_{m1} \cdot \omega_{m1} - B_m \cdot w_{m1}) - J_{h1} \cdot \dot{w}_{h1} - B_h \cdot \ddot{w}_{h1} = \underline{F_{h1} \cdot r_{12}}$

(2) $(\underline{\tilde{z}_{m2}} - J_{m2} \cdot \omega_{m2} - B_m \cdot w_{m2}) - J_{h2} \cdot \dot{w}_{h2} - B_h \cdot \ddot{w}_{h2} = \underline{F_{h2} \cdot r_{22}}$

(1)

$$(\underline{\ddot{x}_{m1}} - J_{m1} \cdot \dot{w}_{m1} - B_{m1} \cdot w_{m1}) - J_{h1} \cdot \dot{w}_{h1} - B_{h1} \cdot w_{h1} = \underline{F_{h1} \cdot r_{12}}$$

$$\underline{\ddot{x}_{m1}} - J_{m1} \cdot \dot{w}_{m1} - J_{h1} \cdot \dot{w}_{h1} - B_{m1} \cdot w_{m1} - B_{h1} \cdot w_{h1} = \underline{F_{h1} \cdot r_{12}}$$

(2)

$$(\underline{\ddot{x}_{m2}} - J_{m2} \cdot \dot{w}_{m2} - B_{m2} \cdot w_{m2}) - J_{h2} \cdot \dot{w}_{h2} - B_{h2} \cdot w_{h2} = \underline{F_{h2} \cdot r_{22}}$$

$$\underline{\ddot{x}_{m2}} - J_{m2} \cdot \dot{w}_{m2} - J_{h2} \cdot \dot{w}_{h2} - B_{m2} \cdot w_{m2} - B_{h2} \cdot w_{h2} = \underline{F_{h2} \cdot r_{22}}$$

2x 1st order differential equations

1 state \downarrow variable each