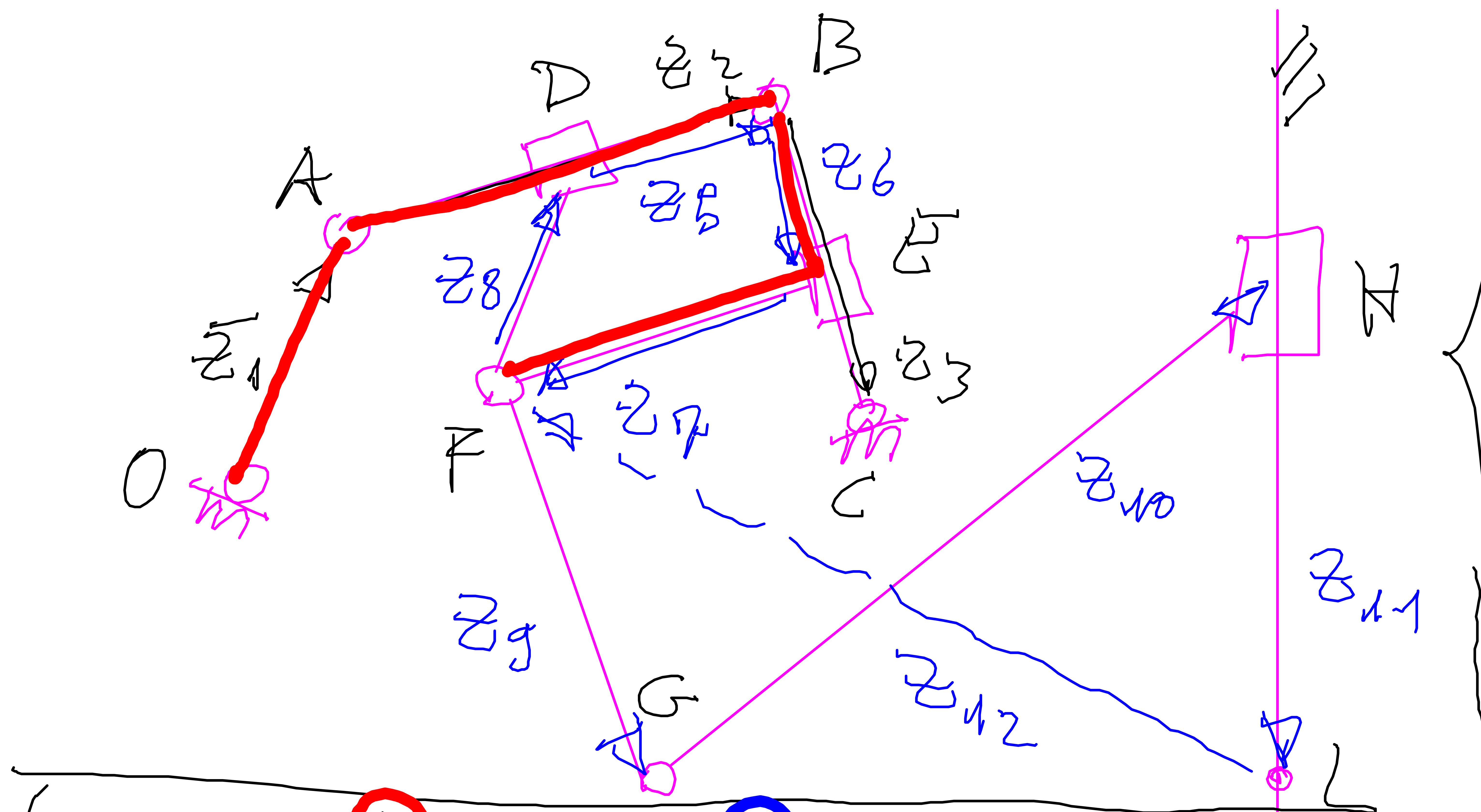


AN. VEL.

$$\begin{cases} \bar z_1 + \bar z_2 + \bar z_3 + CO = 0 \\ \bar z_5 + \bar z_6 + \bar z_7 + \bar z_8 = 0 \\ \bar z_9 + \bar z_{10} + \bar z_{11} + \bar z_{12} = 0 \end{cases}$$

$$\varphi_7 = \varphi_6 + K$$

$$\dot\varphi_7 = \dot\varphi_6 = \dot\varphi_3$$

$$\begin{cases} -z_1 s\varphi_1 \dot\varphi_1 - z_2 s\varphi_2 \dot\varphi_2 - z_3 s\varphi_3 \dot\varphi_3 = 0 \\ z_1 c\varphi_1 \dot\varphi_1 + z_2 c\varphi_2 \ldots = 0 \\ \dot z_5 c\varphi_5 - z_5 s\varphi_5 \dot\varphi_5 + \dot z_6 c\varphi_6 - z_6 s\varphi_6 \dot\varphi_6 - z_7 s\varphi_7 \dot\varphi_7 - z_8 s\varphi_8 \dot\varphi_8 = 0 \\ * = 0 \\ -z_9 s\varphi_9 \dot\varphi_9 + \dot z_{11} c\varphi_{11} + \dot z_{12} c\varphi_{12} - z_{12} s\varphi_{12} \dot\varphi_{12} = 0 \\ * = 0 \end{cases}$$

$$\frac{d}{dt}\left(\overline{z_{12}}\right)$$

$$\overline{z_{12}} = \overline{F} - \overline{L}$$

$$\dot{\overline{z_{12}}} = \dot{\overline{F}}$$

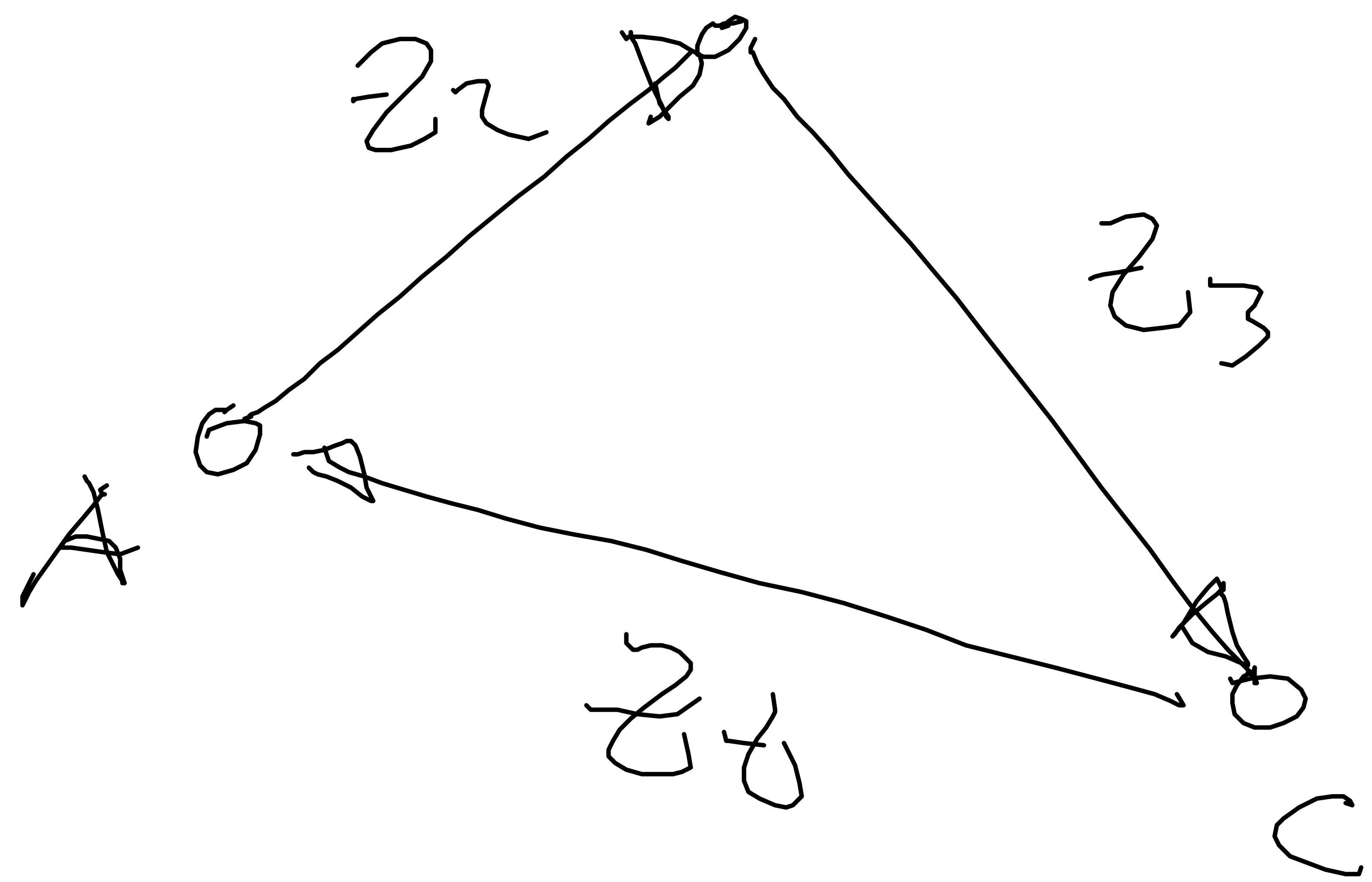
$$\dot{\overline{F}} = \frac{d}{dt}\left(\underset{\dot{\varphi}_1}{\underset{\uparrow}{\overline{z_1}}} + \underset{\dot{\varphi}_2}{\underset{\uparrow}{\overline{z_2}}} + \underset{\dot{\varphi}_3}{\underset{\uparrow}{\overline{z_6}}} + \underset{\dot{\varphi}_3}{\underset{\uparrow}{\overline{z_7}}}\right)$$

$$\begin{bmatrix} & & \\ & J & \\ & & \end{bmatrix} \begin{Bmatrix} \dot{\varphi}_2 \\ \dot{\varphi}_3 \\ \dot{z}_5 \\ \dot{z}_6 \\ \dot{\varphi}_9 \\ \dot{z}_{11} \end{Bmatrix} = -A \, \dot{\varphi}$$

$\dot{\varphi}_1$

$$\dot{A} = -z_1 \begin{Bmatrix} s q \\ -c q \end{Bmatrix} \dot{q}$$

$$\bar{z}_2 + \bar{z}_3 + \bar{z}_t = 0$$

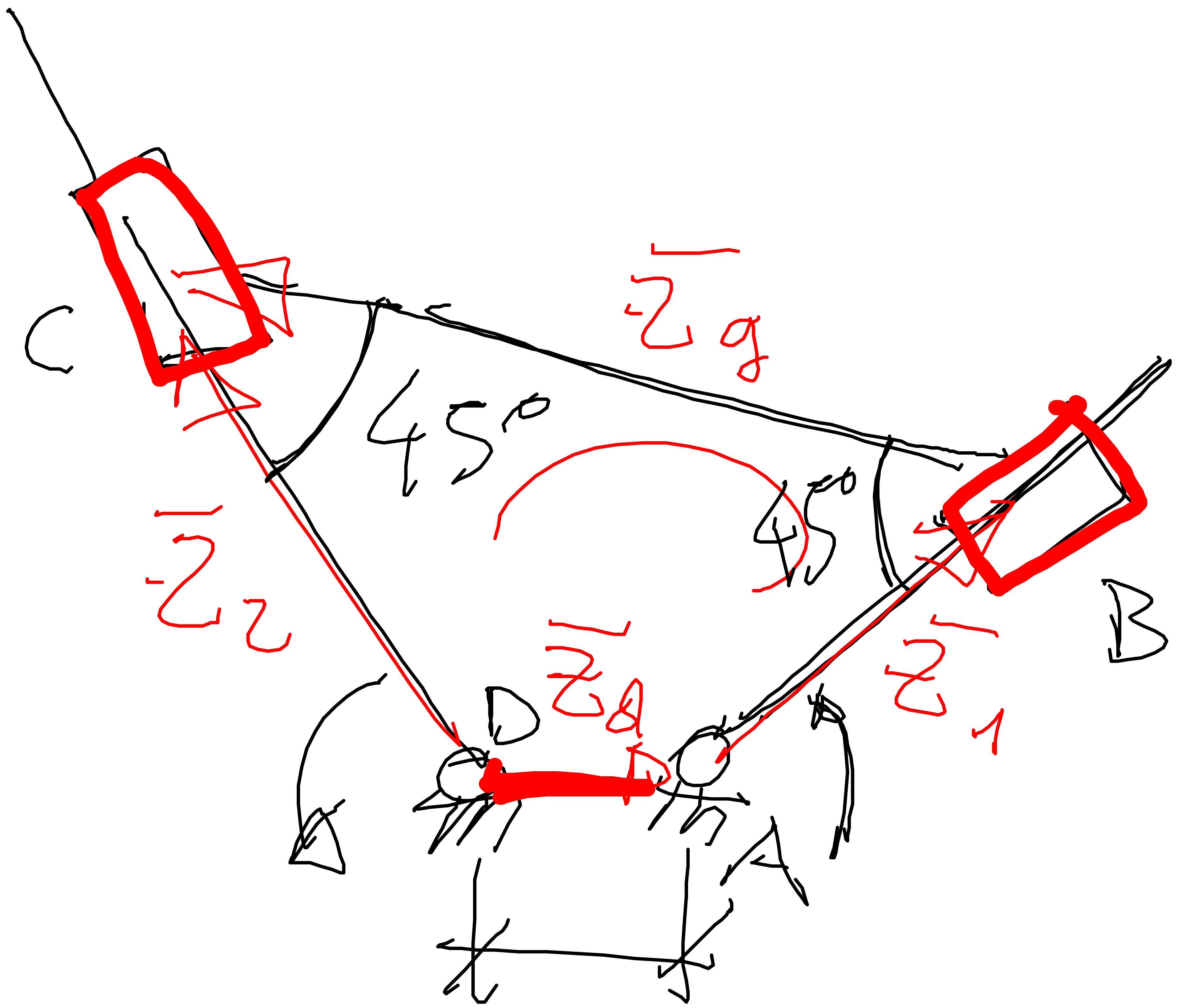


$$\begin{Bmatrix} -z_2 c\varphi_2 \dot{\varphi}_2 - z_3 c\varphi_3 \dot{\varphi}_3 \\ z_2 s\varphi_2 \dot{\varphi}_2 + z_3 s\varphi_3 \dot{\varphi}_3 \end{Bmatrix} + \dot{z}_t = 0$$

$$z_t = A - C$$

$$\dot{z}_t = \dot{A}$$

OLDHAM



$$\bar z_1 + \bar z_g - \bar z_2 + \bar z_d = 0$$

$$\begin{cases} \underline{z_1} \begin{Bmatrix} cq \\ sq \end{Bmatrix} + z_g \begin{Bmatrix} c\left(q+\frac{3}{4}\pi\right) \\ s\left(q+\frac{3}{4}\pi\right) \end{Bmatrix} + \\ - \underline{z_2} \begin{Bmatrix} c\left(q+\frac{\pi}{2}\right) \\ s\left(q+\frac{\pi}{2}\right) \end{Bmatrix} + \begin{Bmatrix} z_d \\ 0 \end{Bmatrix} = 0 \end{cases}$$

$$q_2 = q_1 + \frac{\pi}{2} \Rightarrow \boxed{\dot q_2 = \dot q_1}$$

z_d

$$\begin{bmatrix} cq & -c\left(q+\frac{\pi}{2}\right) \\ sq & -s\left(q+\frac{\pi}{2}\right) \end{bmatrix} \begin{Bmatrix} z_1 \\ z_2 \end{Bmatrix} = -\begin{Bmatrix} z_d \\ 0 \end{Bmatrix} - z_g \begin{Bmatrix} c\left(q+\frac{3}{4}\pi\right) \\ s\left(q+\frac{3}{4}\pi\right) \end{Bmatrix} \quad *$$