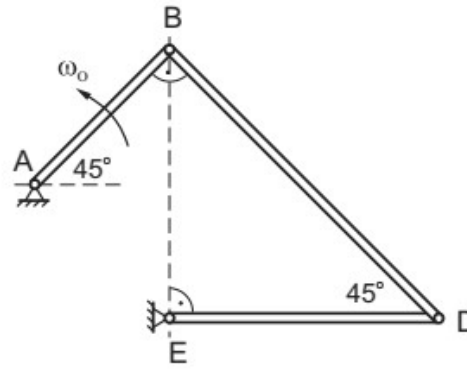


Zadatak 1.36

Za mehanizam prikazan na Slici 1.36 izračunati:

- brzinu i ubrzanje zgloba D ,
- ugaono ubrzanje poluge ED .
- Da li se poluga ED obrće ubrzano ili usporeno?



Slika 1.57: uz zad.1.36.

Poznate su vrednosti: $\omega_0 = \text{const.}$, $\overline{AB} = R$, $\overline{BD} = 2R$.

■ Rešenje 1.36 Brzine:

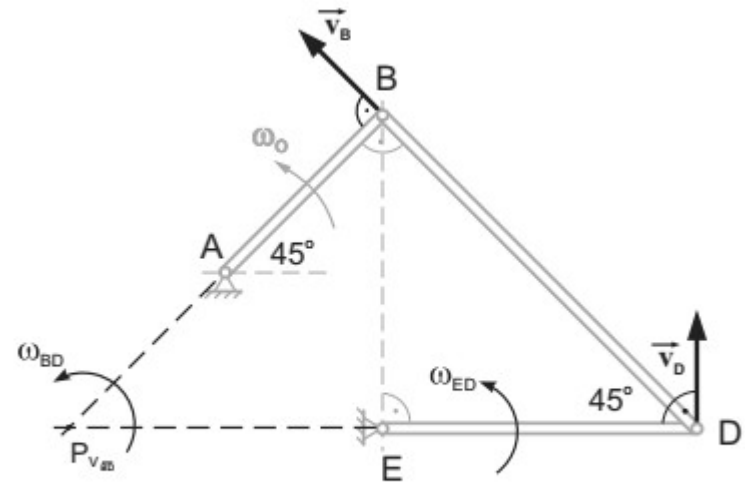
$$\mathbf{v}_B = \mathbf{v}_A^0 + \mathbf{v}_B^A, \Rightarrow v_B = R\omega_0.$$

Projekcija na pravac BD :

$$v_B = v_D \cos 45^\circ \Rightarrow v_D = R\omega_0 \sqrt{2},$$

$$v_B = \overline{BP}_V \cdot \omega_{BD} \Rightarrow \omega_{BD} = \frac{\omega_0}{2},$$

$$v_D = \overline{ED} \cdot \omega_{ED} \Rightarrow \omega_{ED} = \omega_0.$$



Slika 1.58: uz zad.1.36 - brzina.

Ubrzanja:

$$\mathbf{a}_B = \mathbf{a}_A^0 + \mathbf{a}_{Bt}^A + \mathbf{a}_{Bn}^A, \Rightarrow a_B = a_{Bn}^A = \overline{AB}\omega_0^2 = R\omega_0^2,$$

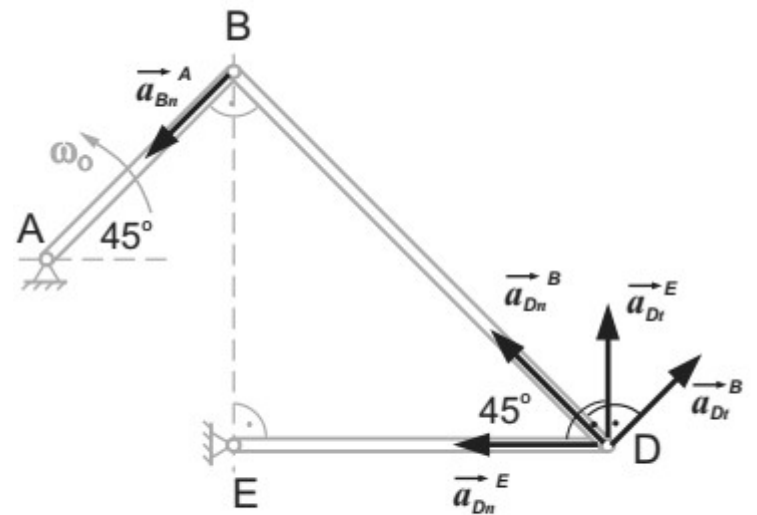
$$\mathbf{a}_D = \mathbf{a}_B + \mathbf{a}_{Dt}^B + \mathbf{a}_{Dn}^B,$$

$$a_{Dn}^B = \overline{BD} \cdot \omega_{BD}^2 \Rightarrow a_{Dn}^B = \frac{R\omega_0^2}{2},$$

$$\mathbf{a}_D = \mathbf{a}_E^0 + \mathbf{a}_{Dt}^E + \mathbf{a}_{Dn}^E,$$

$$a_{Dn}^E = \overline{ED} \cdot \omega_{ED}^2 \Rightarrow a_{Dn}^E = R\omega_0^2 \sqrt{2}.$$

$$\mathbf{a}_{Dt}^E + \mathbf{a}_{Dn}^E = \mathbf{a}_B + \mathbf{a}_{Dt}^B + \mathbf{a}_{Dn}^B$$



Slika 1.59: uz zad.1.36 - ubrzanje.

Projekcija na pravac BD :

$$a_{Dt}^E \cos 45^\circ + a_{Dn}^E \sin 45^\circ = a_{Dn}^B, \Rightarrow$$

$$a_{Dt}^E \frac{\sqrt{2}}{2} = \frac{R\omega_0^2}{2} - R\omega_0^2 \sqrt{2} \frac{\sqrt{2}}{2} \Rightarrow a_{Dt}^E = -R\omega_0^2 \frac{\sqrt{2}}{2}.$$

$$a_D = \sqrt{(a_{Dt}^E)^2 + (a_{Dn}^E)^2} = R\omega_0^2 \sqrt{2 + \frac{2}{4}} \Rightarrow a_D = \frac{R\omega_0^2}{2} \sqrt{10},$$

$$a_{Dt}^E = \overline{ED} \cdot \epsilon_{ED} \Rightarrow \epsilon_{ED} = -\frac{\omega_0^2}{2} - \text{usporeno kretanje.}$$