POLŽASTE DUOJICE

$z_2 > z_1 \rightarrow$ OTOBNO RAZMERJE $u = \frac{z_2}{z_1} > 1$

OSI POLŽNIŽA STA MIMOBEŽNI IN ODMAŽNJENI ZA MEDOSNI RAZMIK a. ŽOT MED OSEMA $\Sigma = 90°$

$15 \leqslant u \leqslant 70$ PRI PRESTAVAH V POČASI

$5 \leqslant u < 15$ PRI PRESTAVAH V HITRO

IMAMO PRETEŽNO DRSNO GIBANJE → TIH IN MIREN TEČ TER DOLGA ŽIVLJENJSKA DOBA.

ČE JE GONILO SAMOZAPORNO → $\eta \downarrow$

ŽOMPAČTNA GONILA GLEDE NA PRENEŠENO MOČ

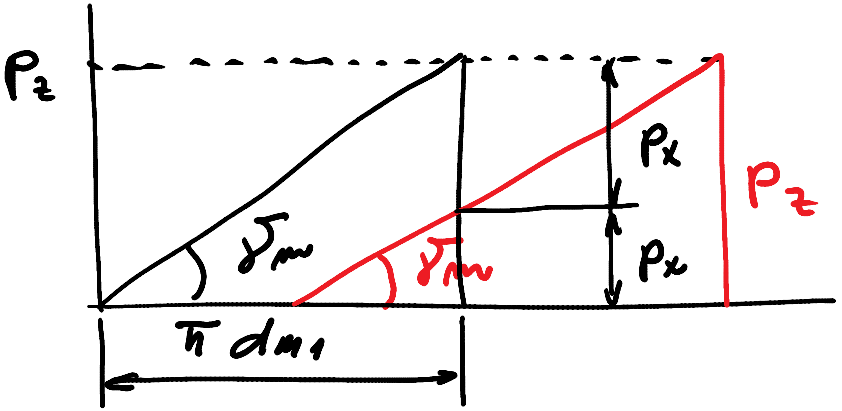
OBČUTLJIVE NA SPREMEMBO MEDOSNEGA RAZMIKA

SLAB IZKORISTEK

PROBLEM ODVODA TOPLOTE

RAZLIKUJEMO - VALJASTE POLŽASTE DUOJICE
- GLOBOIDNE POLŽASTE DUOJICE

DOLOČILNE VELIČINE POLŽA



$$tg\,\gamma_m = \frac{p_z}{\pi d_{m1}}$$

- γ_m – KOT VZPONA VIJAČNICE NA SREDNJEM VALJU (15° - 25°)
- p_z – HOD VIJAČNICE
- d_{m1} – PREMER SREDNJEGA VALJA POLŽA

$p_z = z_1 \cdot p_x$ – OSNI RAZDELEK

$z_1 = 2$ DVOSTOPENJSKI POLŽ

$z_1 = \{1, 2, 3, 4, 6\}$

$p_x = \pi m_x$

m_x – OSNI MODUL STANDARDIZIRAN PO DIN 3976

$$z = \frac{d_{m1}}{m_x}$$ POLŽNA ZNAČILNICA

$z \downarrow \rightarrow$ POLŽ MANJ TOG

MANJŠE OBODNE HITROSTI → MANJŠA OBRABA

VEČJI IZKORISTEK

$$\operatorname{tg}\gamma_m = \frac{p_z}{\pi d_{m1}} = \frac{z_1 \cdot p_x}{\pi d_{m1}} = \frac{z_1 \, m_x \cdot \cancel{\pi}}{\cancel{\pi} \, d_{m1}} = \frac{z_1}{z}$$

OSNI RAZDELEK p_x JE ENAK NA POLJUBNEM PREMERU MED VIJAČNIM IN TEMENSKIM KROGOM → RAZDELNI VALJ PRI POLŽU NE OBSTAJA

$$d_{m1} = 2a - d_{m2}$$

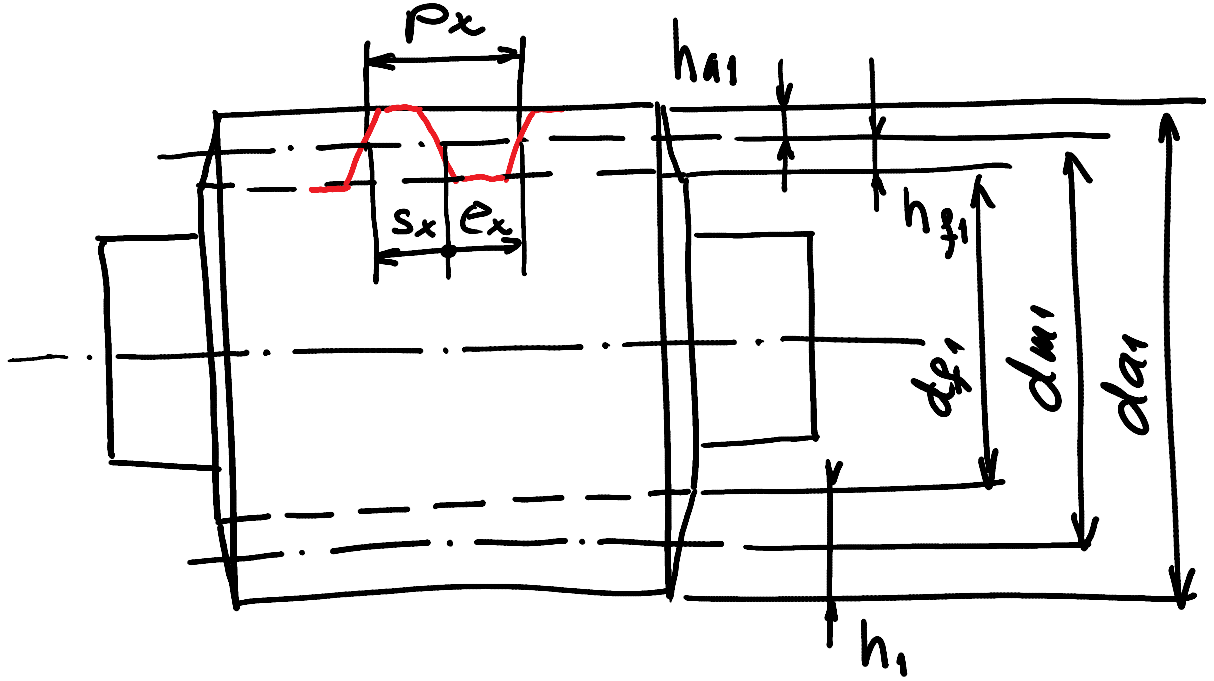
VIŠINA ZOBNEGA KORENA $h_{f1} = 1.2\, m_x$

VIŠINA ZOBNEGA URHA $h_{a1} = 1 \cdot m_x$

VIŠINA ZOBA POLŽA $h_1 = h_{f1} + h_{a1}$

PREMER VZNOŽNEGA VALJA POLŽA $d_{f1} = d_{m1} - 2h_{f1}$

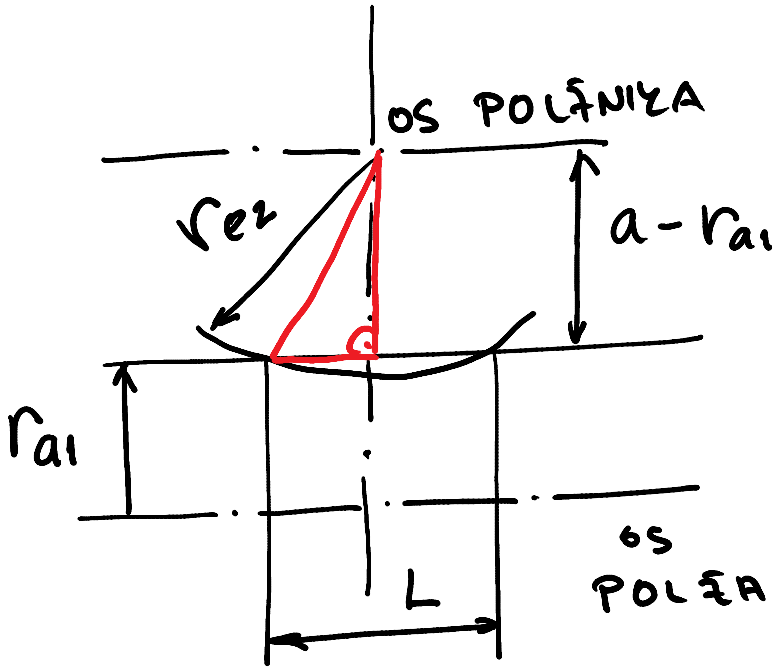
PREMER TEMENSKEGA VALJA POLŽA $d_{a1} = d_{m1} + 2h_{a1}$



$$p_x = s_x + e_x$$

DEBELINA ZOBA NA SREDNJEM VALJU $s_x = \frac{p_x}{2}$

ŠIRINA MEDZOBNE VRZELI NA SREDNJEM VALJU $e_x = \frac{p_x}{2}$

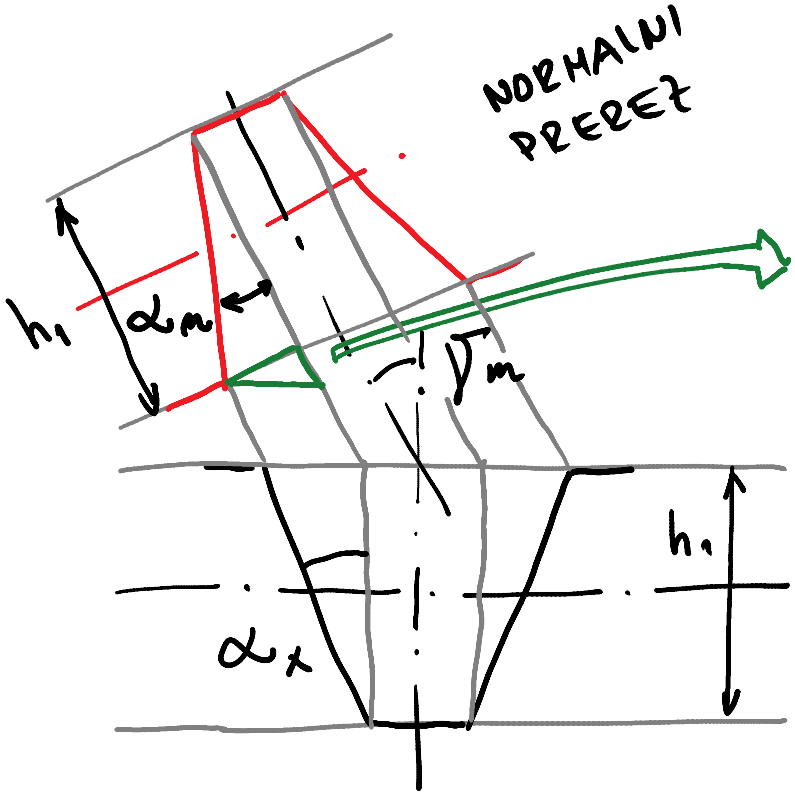


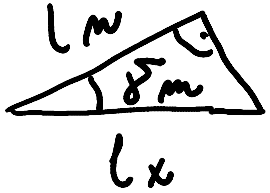
$$\left(\frac{L}{2}\right)^2 = r_{e2}^2 - (a - r_{a1})^2$$

$$L = 2\sqrt{r_{e2}^2 - (a - r_{a1})^2}$$

L – DOLŽINA OZOBLJENEGA DELA POLŽA

r_{e2} – POLMER ZUNANJEGA VALJA POLŽNIKA





$$\cos\gamma_n = \frac{l_n}{l_x}$$

$$\operatorname{tg}\alpha_x = \frac{l_x}{h_1}$$

$$\operatorname{tg}\alpha_n = \frac{l_n}{h_1}$$

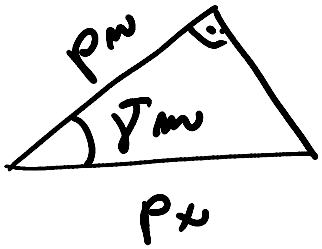
$$l_n = l_x \cdot \cos\gamma_n$$

$$h_1 \operatorname{tg}\alpha_n = h_1 \operatorname{tg}\alpha_x \cos\gamma_n$$

$$\operatorname{tg}\alpha_n = \operatorname{tg}\alpha_x \cos\gamma_n$$

α_n – VPADNI KOT V NORMALNEM PREREZU

α_x – VPADNI KOT V OSNEM PREREZU



$$p_n = p_x \cdot \cos\beta_n$$

p_n – NORMALNI RAZDELEK POLŽA

$$p_n = s_n + e_n = s_x \cdot \cos\beta_n + e_x \cos\beta_n$$

$$s_n = s_x \cdot \cos\beta_n$$

s_n – DEBELINA ZOBA NA SREDNJEM VALJU V NORMALNEM PREREZU

$$e_n = e_x \cos\beta_n$$

e_n – ŠIRINA MEDZOBNE VRZELI NA SREDNJEM VALJU V NORMALNEM PREREZU

$$p_n = m_{wn} \cdot \pi$$

$$p_x = m_{wx} \cdot \pi$$

$$m_n \cdot \pi = m_x \cdot \pi \cos\beta_n$$

$$m_n = m_x \cos\beta_n$$

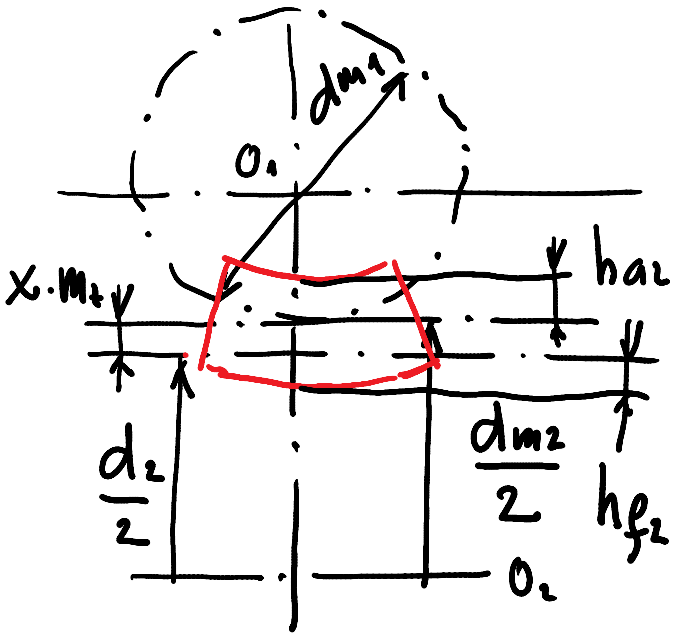
m_n – NORMALNI MODUL

DOLOČILNE VELIČINE POLŽNIKA

$\beta_{mw} = \gamma_{mw}$ KOT POSEVNOSTI ZOB POLŽNIKA

$m_t = m_{wx}$ RADIALNI MODUL POLŽNIKA

$d_2 = m_t z_2$ PREMER RAZDELNEGA VALJA POLŽNIKA



$d_2 = d_{m2} - 2x \cdot m_t$

d_{m2} – PREMER SREDNJEGA VALJA POLŽNIKA

$a = \frac{d_{m1} + d_{m2}}{2}$ OSNI RAZMIK

$d_{m2} = 2a - d_{m1}$

$h_{f2} = 1{,}2\, m_t$ VIŠINA TOBNEGA LOČENA

$h_{a2} = 1.0\, m_t$ VIŠINA TOBNEGA URHA

$h_2 = h_{f2} + h_{a2}$ VIŠINA TOBA POLŽNIKA

$d_{f2} = d_{m2} - 2h_{f2}$ PREMER VZNOŽNEGA VALJA

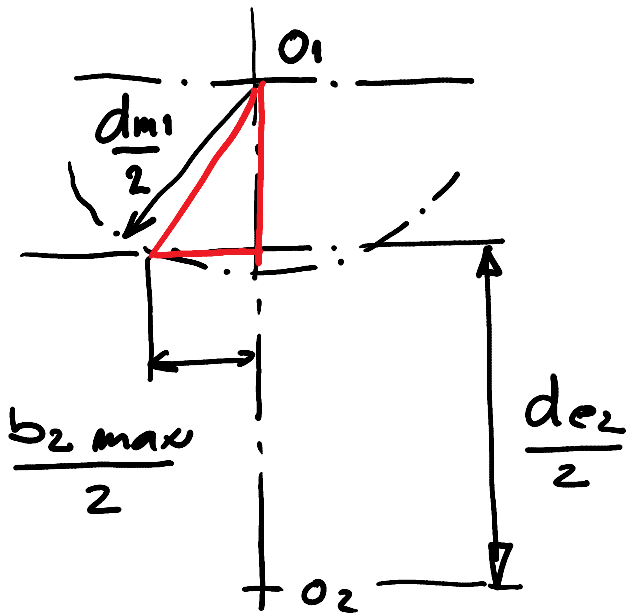
$d_{a2} = d_{m2} + 2h_{a2}$ PREMER TEMENSKEGA VALJA

$d_{e2} \cong d_{a2} + m_t$ PREMER ZUNANJEGA VALJA POLŽNIKA

$p_2 = m_t \cdot \pi$ RAZDELEK POLŽNIKA

$e_2 = S_x$ ŠIRINA MED TOBNE URŽELI

$s_2 = p_2 - e_2$ DEBELINA TOBA POLŽNIKA



$$\left(\frac{b_{2max}}{2}\right)^2 = \left(\frac{d_{m1}}{2}\right)^2 - \left(a - \frac{d_{e2}}{2}\right)^2$$

$$b_{2max} = 2 \cdot \sqrt{\left(\frac{d_{m1}}{2}\right)^2 - \left(a - \frac{d_{e2}}{2}\right)^2}$$

$b_2 \leq b_{2max}$

ŠIRINA ZOB POLŽNIKA

IZKORISTEK POLŽASTIH DUOJIC

$$P_{iz} = P_z + P_o + P_L + P_T$$

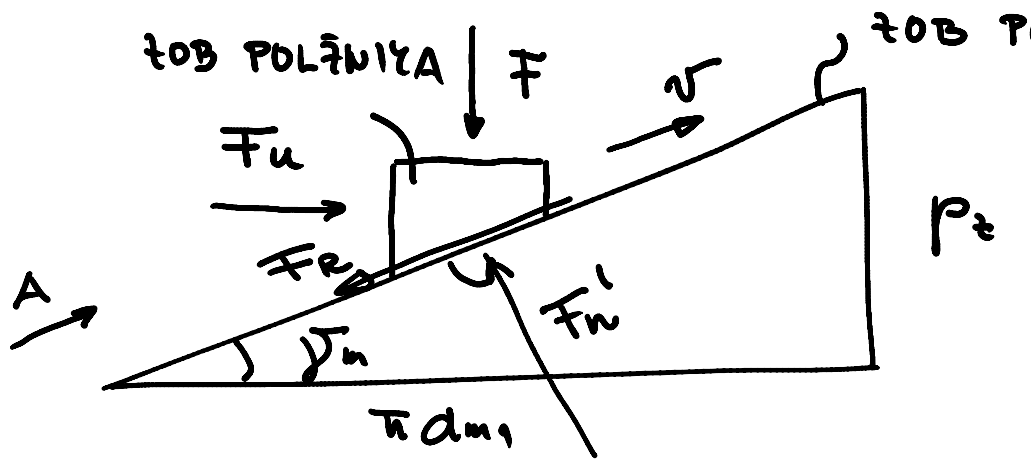
P_z – IZGUBA MOČI PRI UBIRANJU

P_o – IZGUBA MOČI V PROSTEM TEKU $\quad P_o = f(\omega_1, a)$

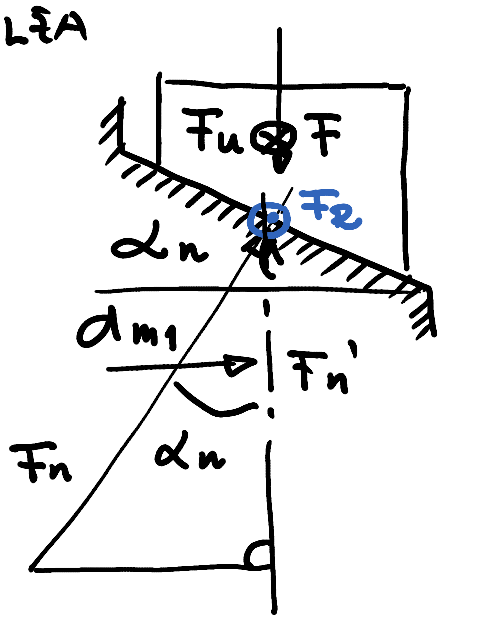
P_L – IZGUBA MOČI V LEŽAJIH $\quad P_L = 0.02 \dots 0{,}03\, P_1$ – MOČ DOVEDENA NA POLŽA

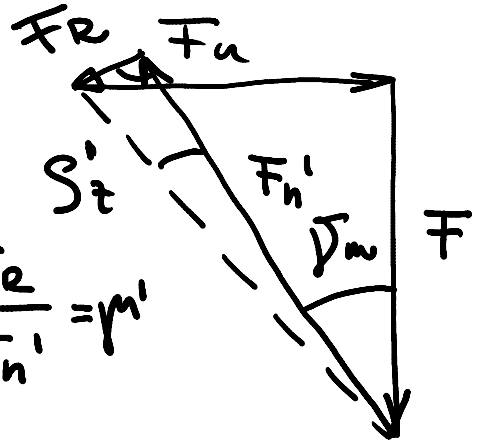
P_T – IZGUBA MOČI V TESNILIH $\quad P_T = f(\omega_1, d_{m1})$

POLŽ GONILNI



POGLED A





$$\operatorname{tg}\rho_t' = \frac{F_R}{F_n'} = \mu'$$

$$F_R = F_n \cdot \mu$$

$$\cos\alpha_n = \frac{F_n'}{F_n}$$

$$F_R = F_n' \frac{\mu}{\cos\alpha_n} = F_n' \cdot \mu'$$

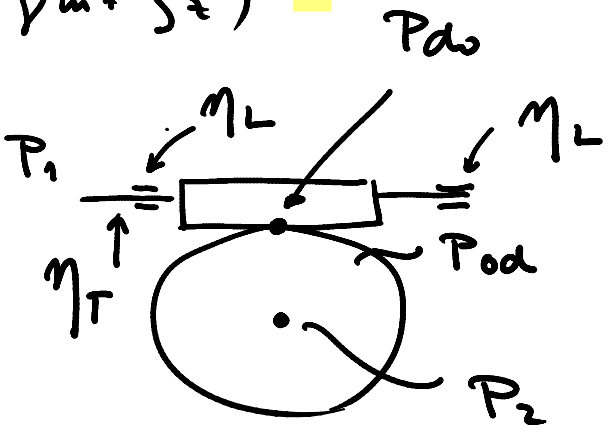
$$\eta_z = \frac{A_{od}}{A_{do}}$$

$$A_{do} = F_u \cdot \pi d_{m_1} \quad ; \quad A_{od} = F\, p_z$$

$$\eta_z = \frac{F\, p_z}{F_u\, \pi d_{m_1}} = \frac{\operatorname{tg}\gamma_m}{\operatorname{tg}(\gamma_m + \rho_z')}$$

$$\operatorname{tg}(\gamma_m + \rho_z') = \frac{F_u}{F}$$

$$\operatorname{tg}\gamma_m = \frac{p_z}{\pi\, d_{m_1}}$$

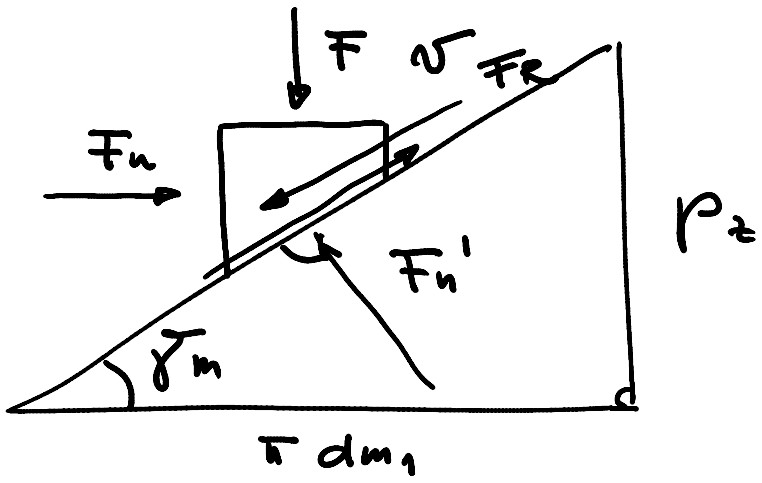


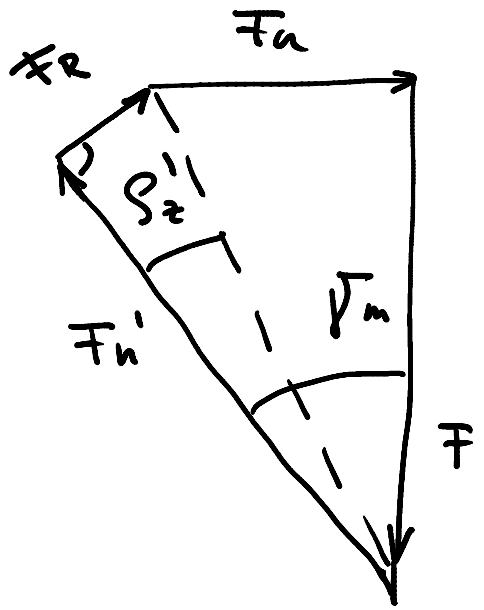
$$\eta_z = \frac{P_{od}}{P_{do}} = \frac{P_1 \eta_L^2 \eta_T - P_z}{P_1 \eta_L^2 \eta_T}$$

$$P_{do} = P_1 \cdot \eta_L^2\, \eta_T$$

POLŽNIK GONILNI

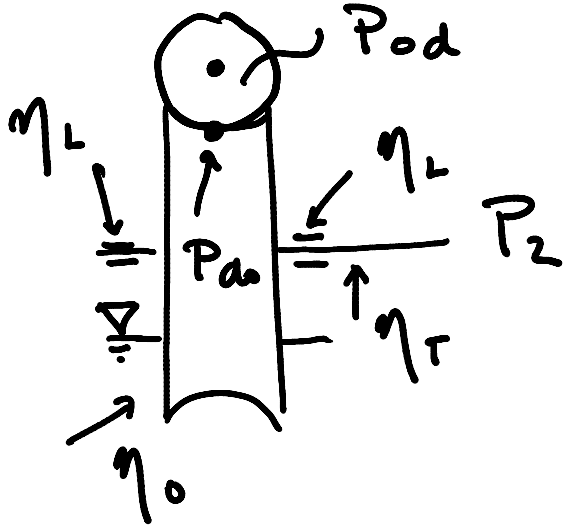
$\gamma_m > \rho_z'$ NI SAMOZAPORNOST!





$$\operatorname{tg}(\gamma_m - \rho_z') = \frac{F_u}{F}$$

$$\eta_z' = \frac{A_{od}}{A_{do}} = \frac{F_u \cdot \pi d_{m1}}{F \rho_z} = \frac{\operatorname{tg}(\gamma_m - \rho_z')}{\operatorname{tg}\gamma_m}$$



$$P_{do} = P_2 \cdot \eta_L^2 \eta_T \eta_0$$

$$\eta_z^1 = \frac{P_{od}}{P_{do}} = \frac{P_2 \eta_L^2 \eta_T \eta_0 - P_z}{P_2 \eta_L^2 \eta_T \eta_0}$$