

Univerza v Ljubljani  
Fakulteta za strojništvo



*Katedra za strojne elemente in razvojna vrednotenja*

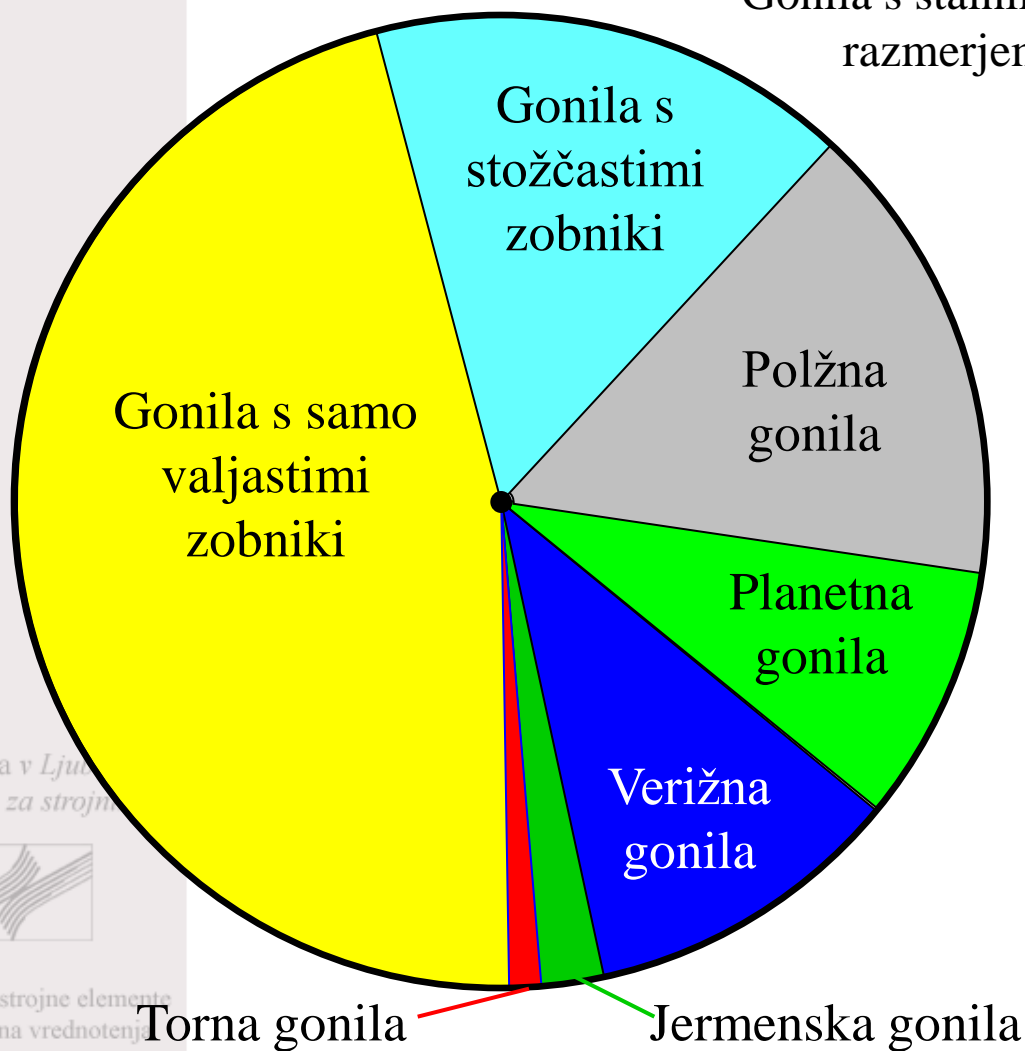


# **Strojni elementi 2**

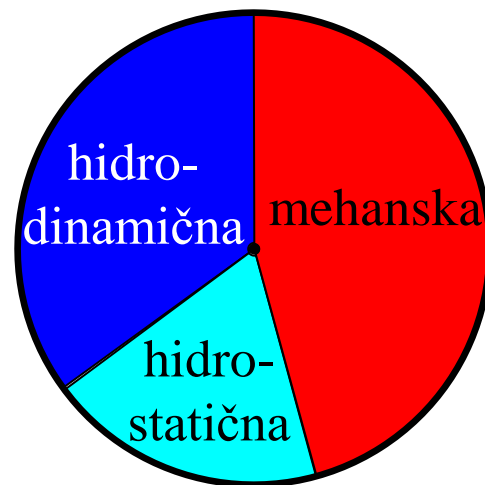
## **Zobniška gonila**

Gorazd Fajdiga, Marko Nagode

Gonila s stalnim prestavnim  
razmerjem (75%)



Gonila z nastavljivim prestavnim  
razmerjem (25%)

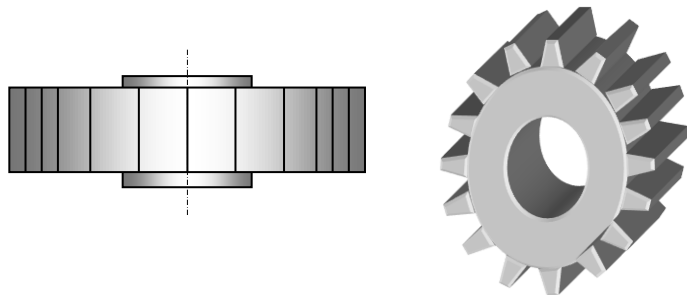


## Glede na:

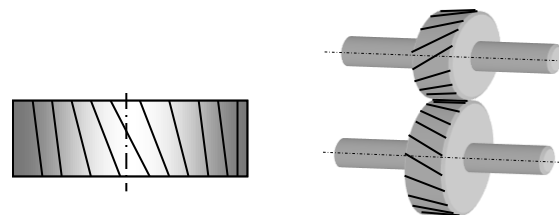
- obliko telesa zobnika (valjaste, stožčaste in hiperboloidne)
- obliko ozobja (ravno, poševno, zavito)
- položaj ozobja (z notranjim in zunanjim ozobjem ter zobate letve)
- vrsto ozobja (evolventni, cikloidni, palčni...)
- način montaže na objekt (pastorki, zobniki, venci)
- druge kriterije (namen, kvaliteta, material,...)



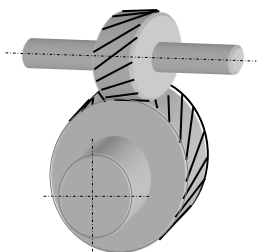
- z ravnim ozobjem



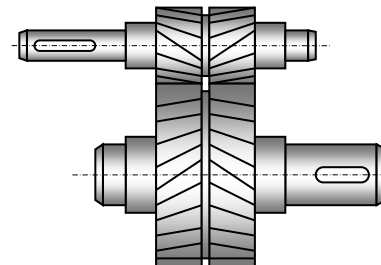
- s poševnim ozobjem



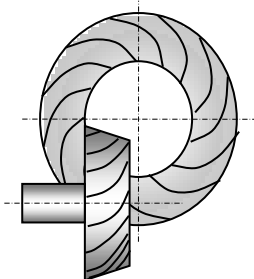
- z vijačnim ozobjem (kot poševnosti več kot  $30^\circ$ )



- z dvojnimi poševnimi in puščičastimi ozobjem



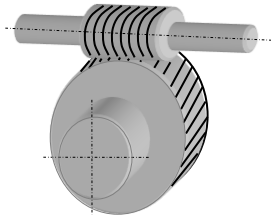
- z zavitim ozobjem (ločno, spiralno, hipoidno....)



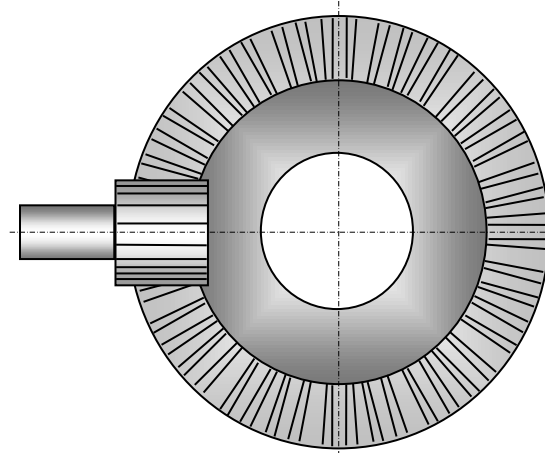
- z ločnim (v aksialni ravnini) ozobjem



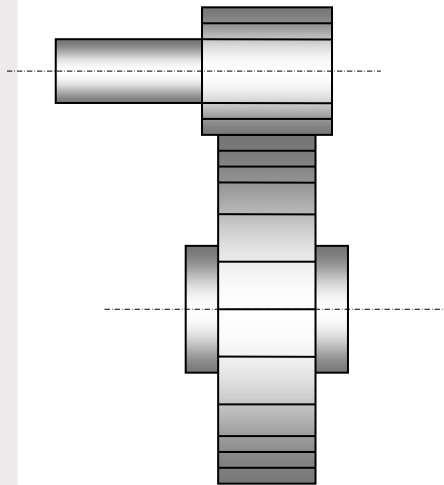
- polžni zobniki



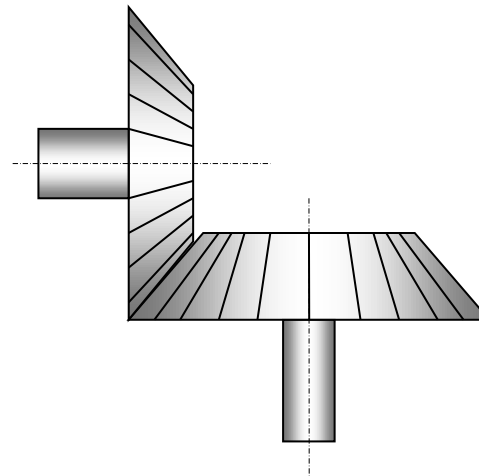
- s kronskim ozobjem (en zobnik je valjast)



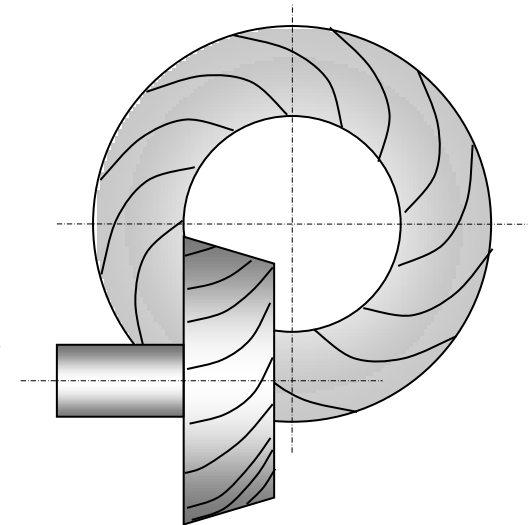
- valjaste



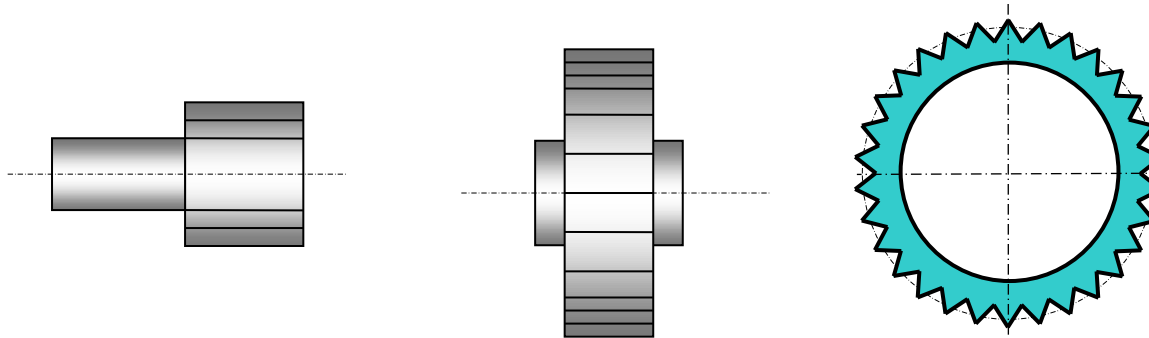
- stožčaste



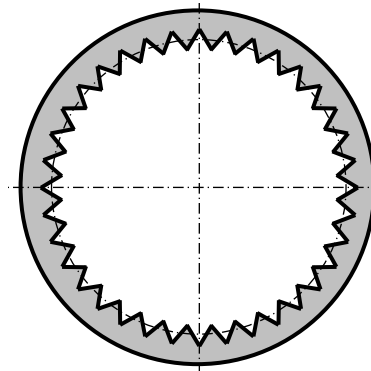
- hiperboloidne



- zunanje

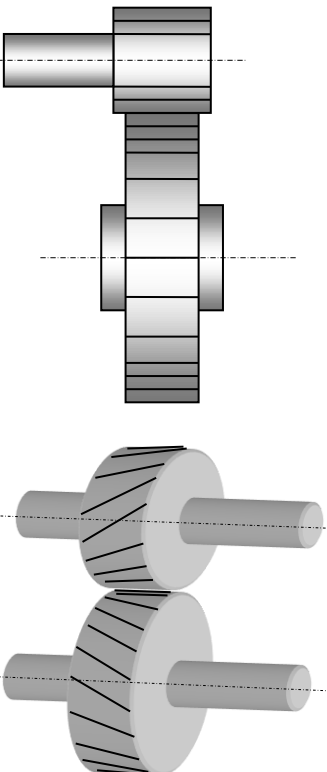
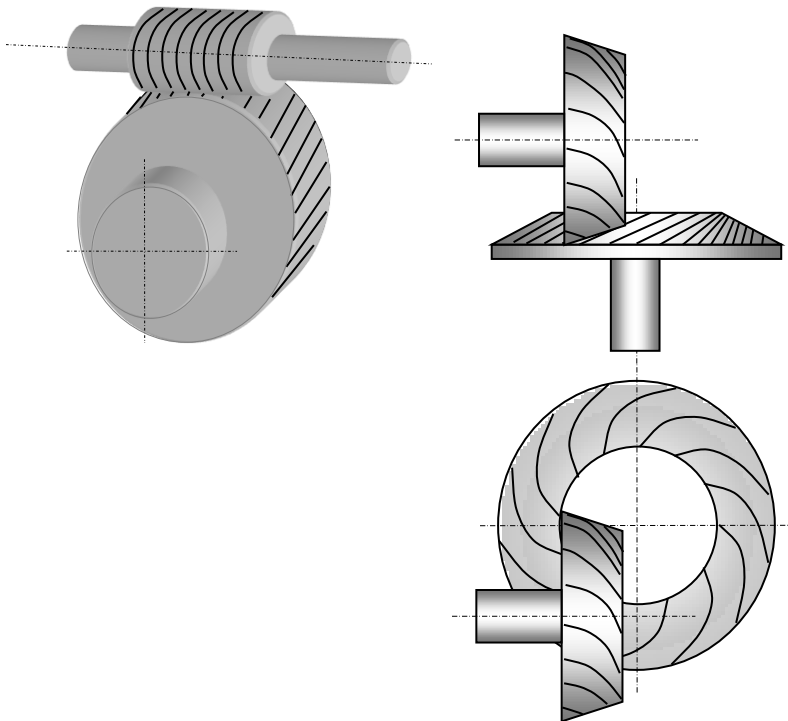
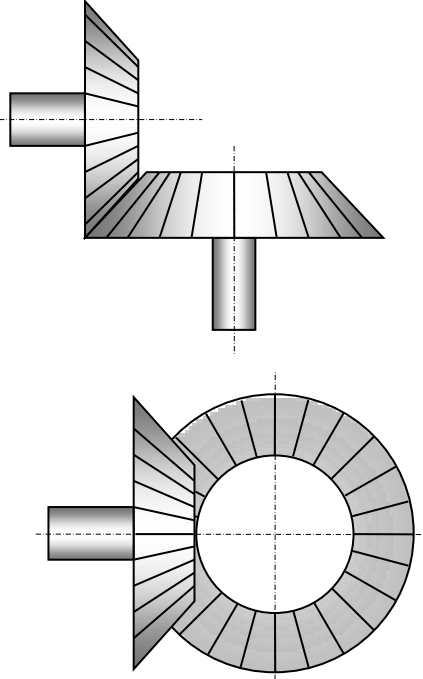


- notranje



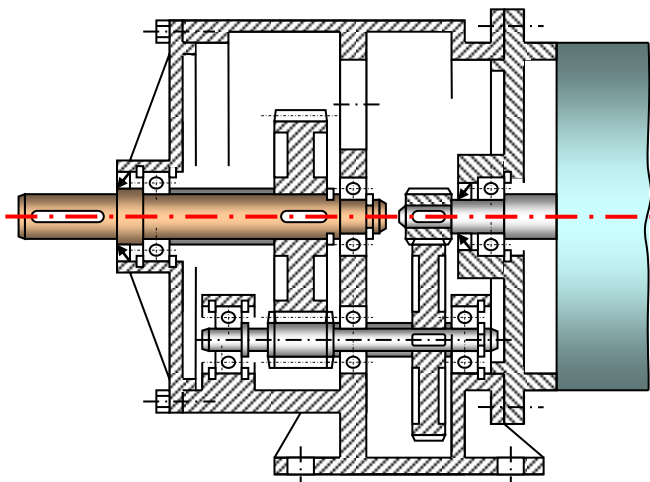
- ravno – zobata letev



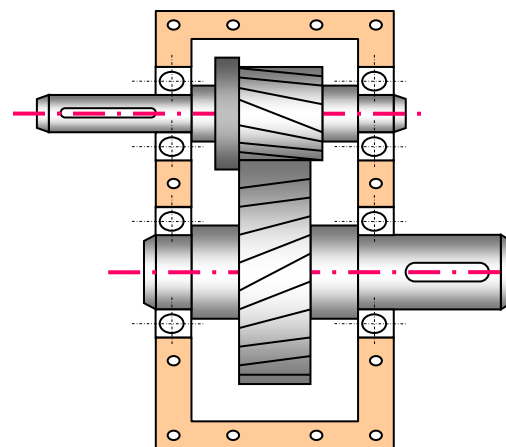
VZPOREDNE OSI	MIMOBEŽNE OSI	OSI SE SEKAJO
<p>valjasti zobniški par</p>	<p>polžni par</p> <p>hipoidno gonilo (hiperbolojna zobnika)</p>	<p>stožčasti zobniški par</p>
		



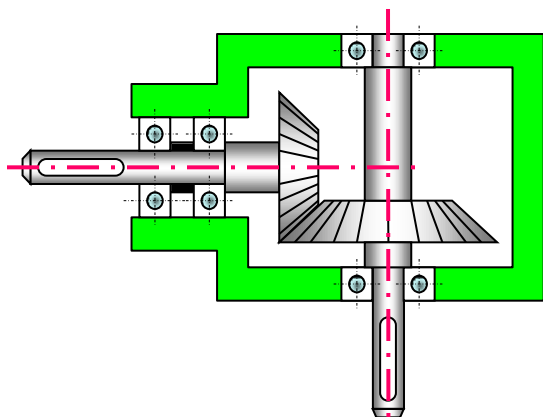
- koaksialna (soosna) gonila



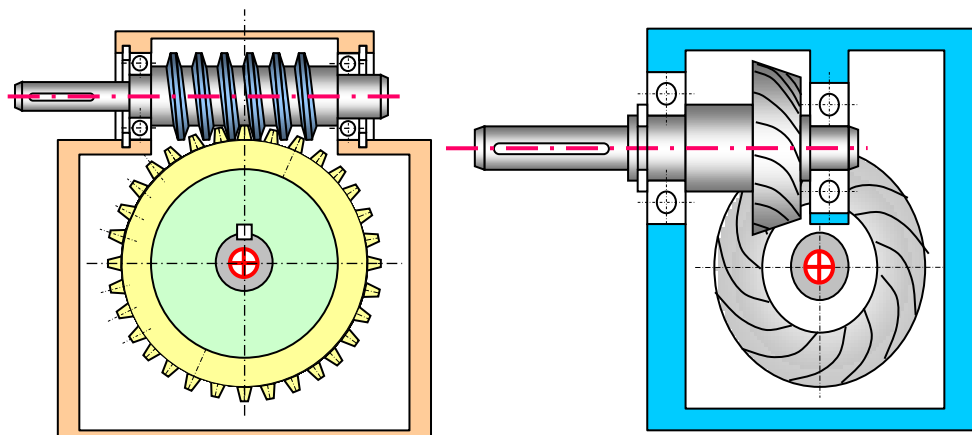
- gonila z vzporednimi gredmi

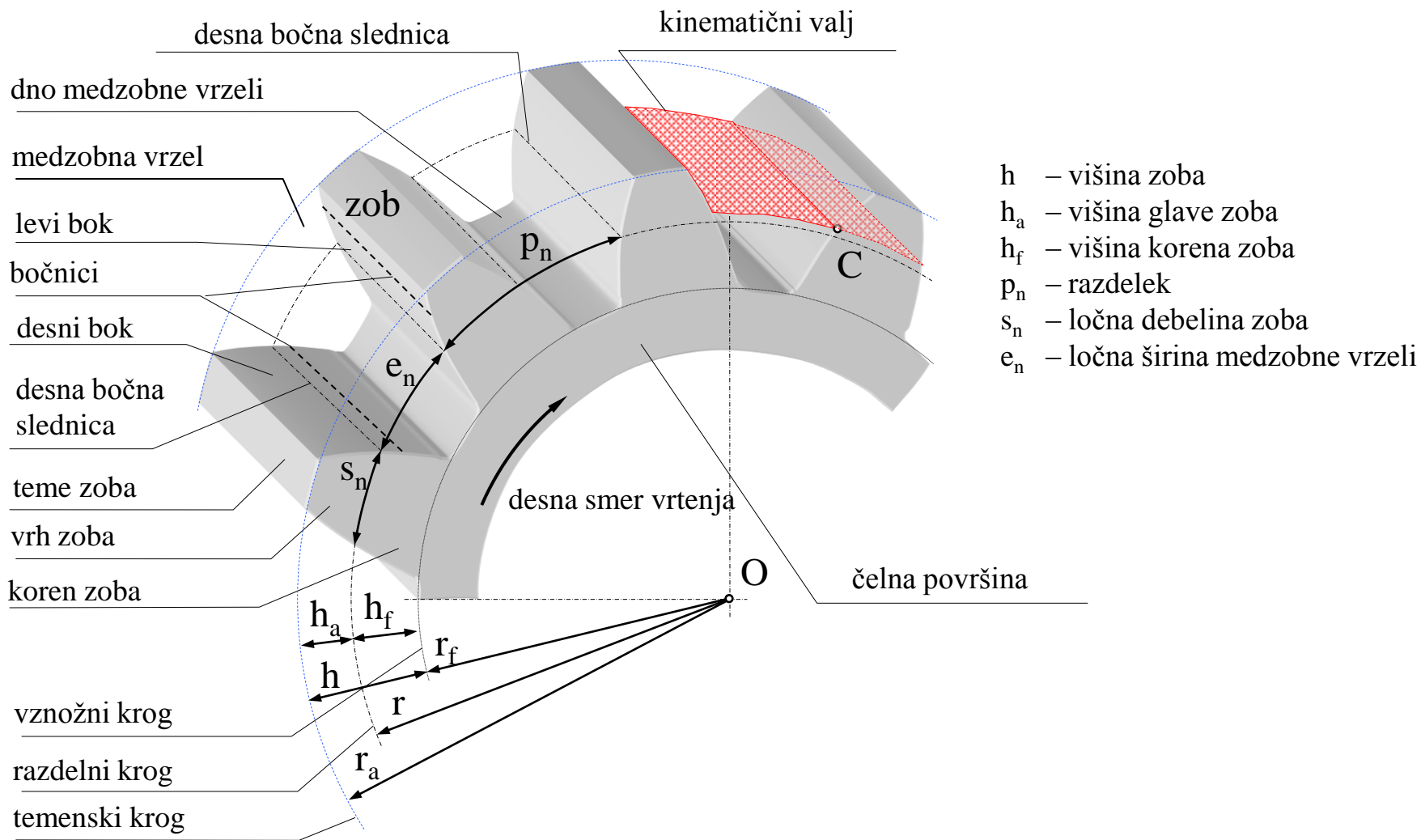


- gonila s sekajočimi gredmi

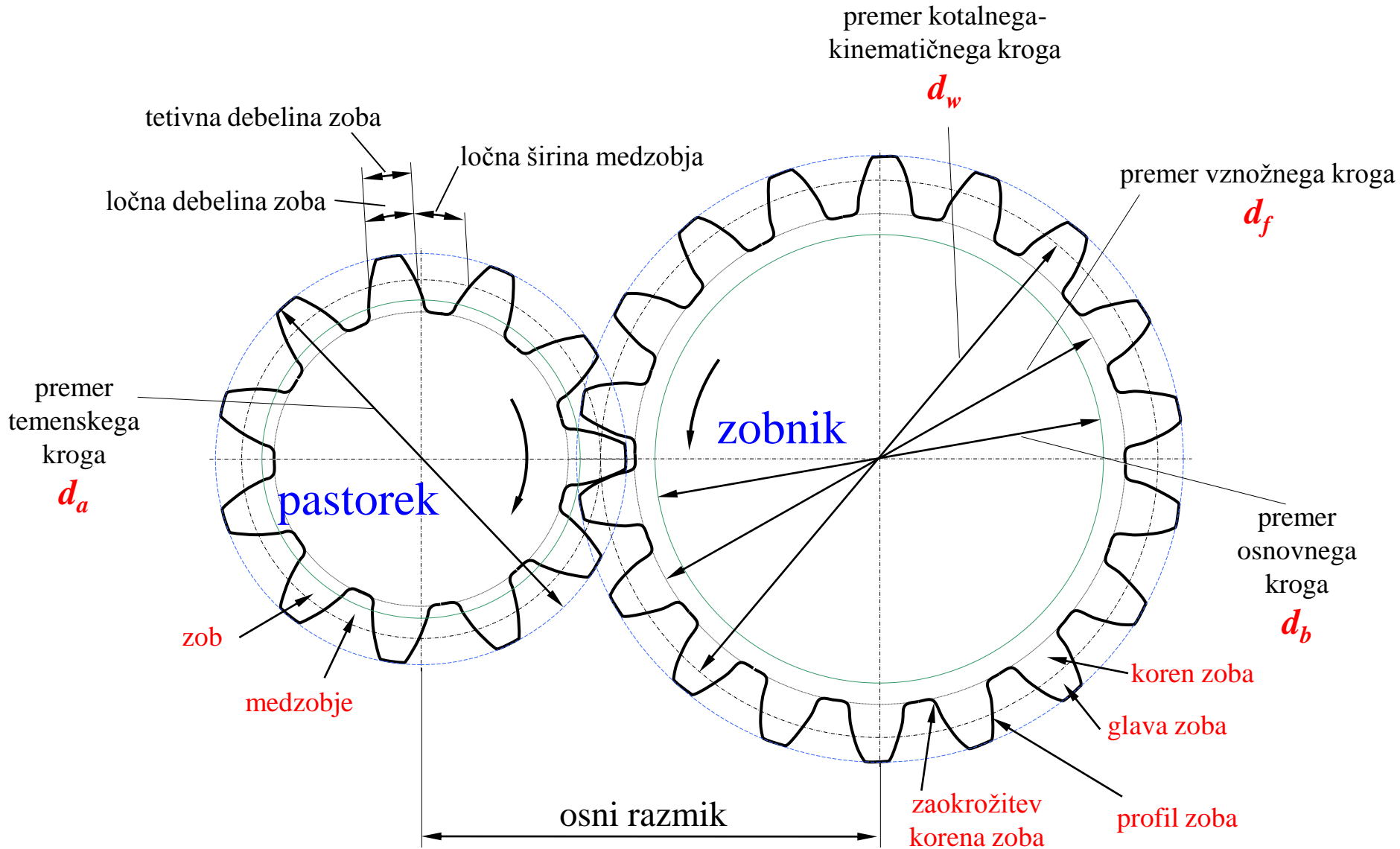


- gonila z mimobežnimi gredmi

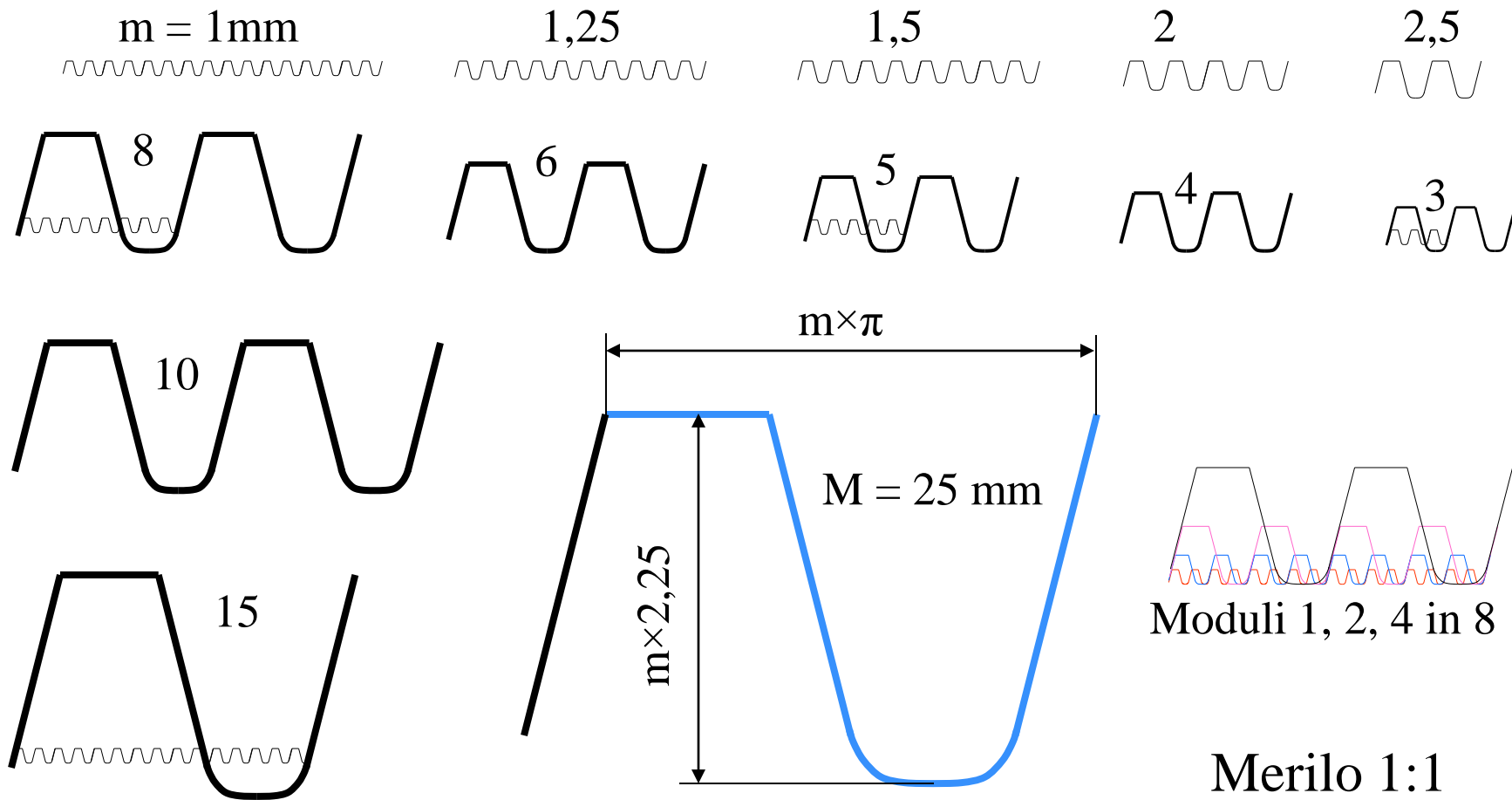


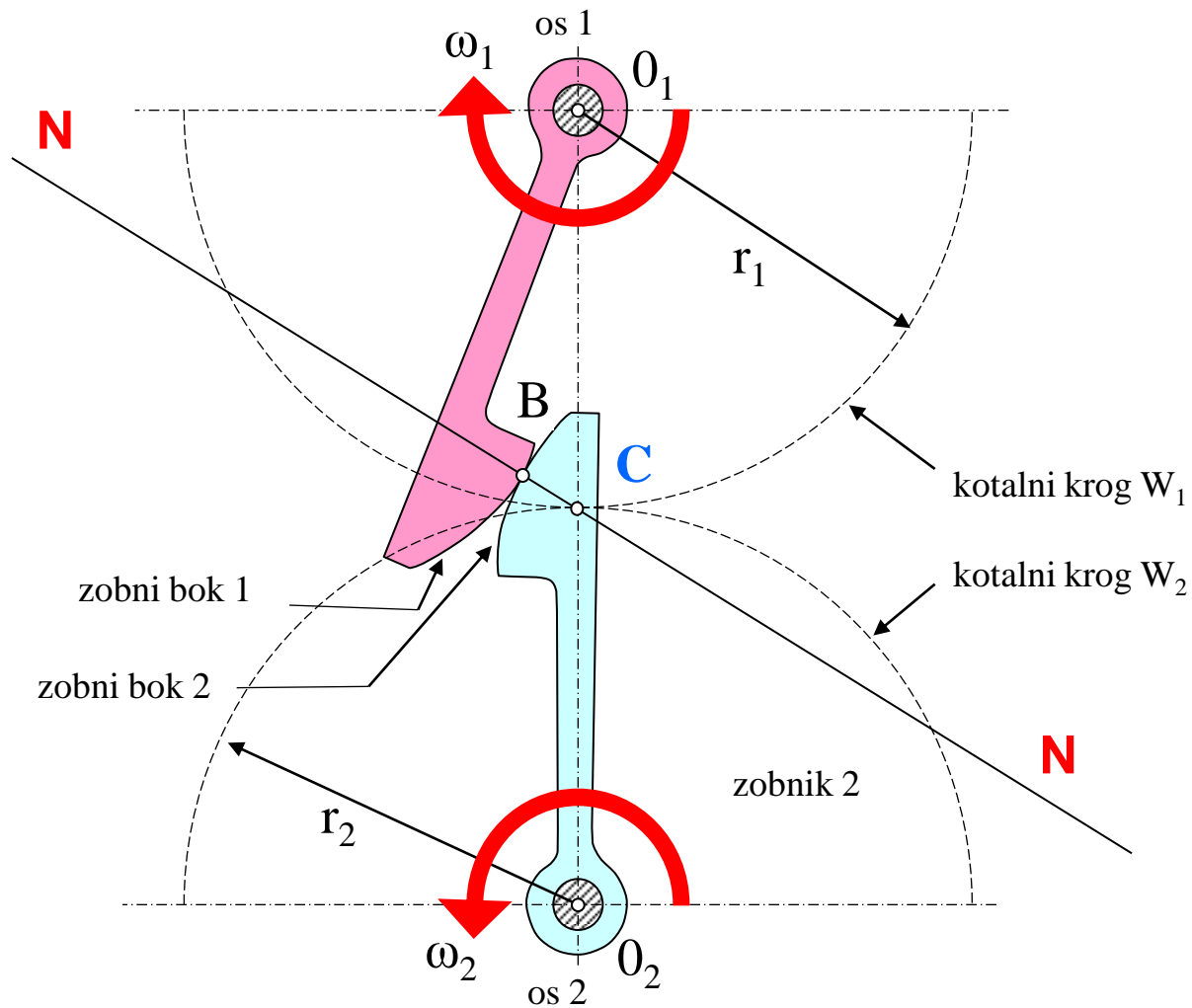


# Poimenovanje in oznake zobnikov v ubiru

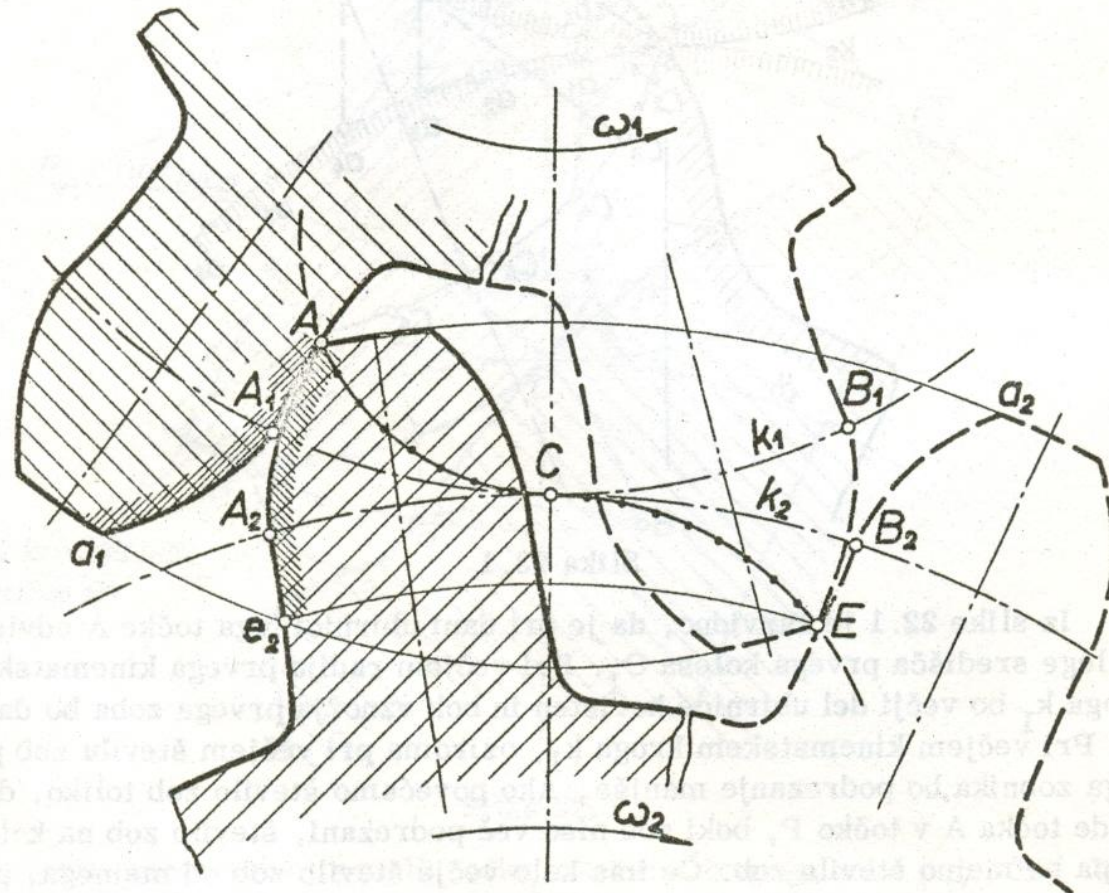


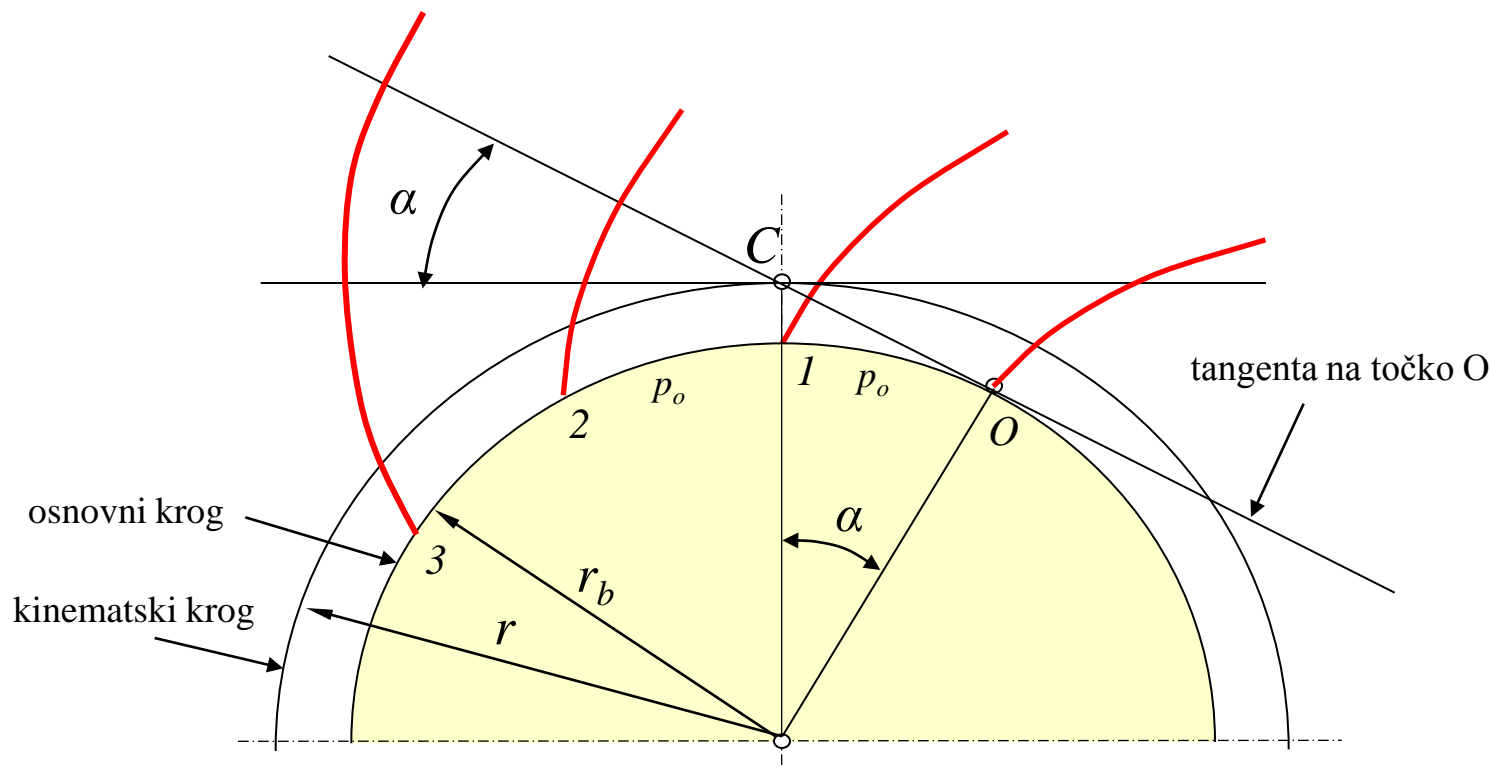
# Velikost zob z različnimi moduli (zobata letev)





# Dolžina ubirnice



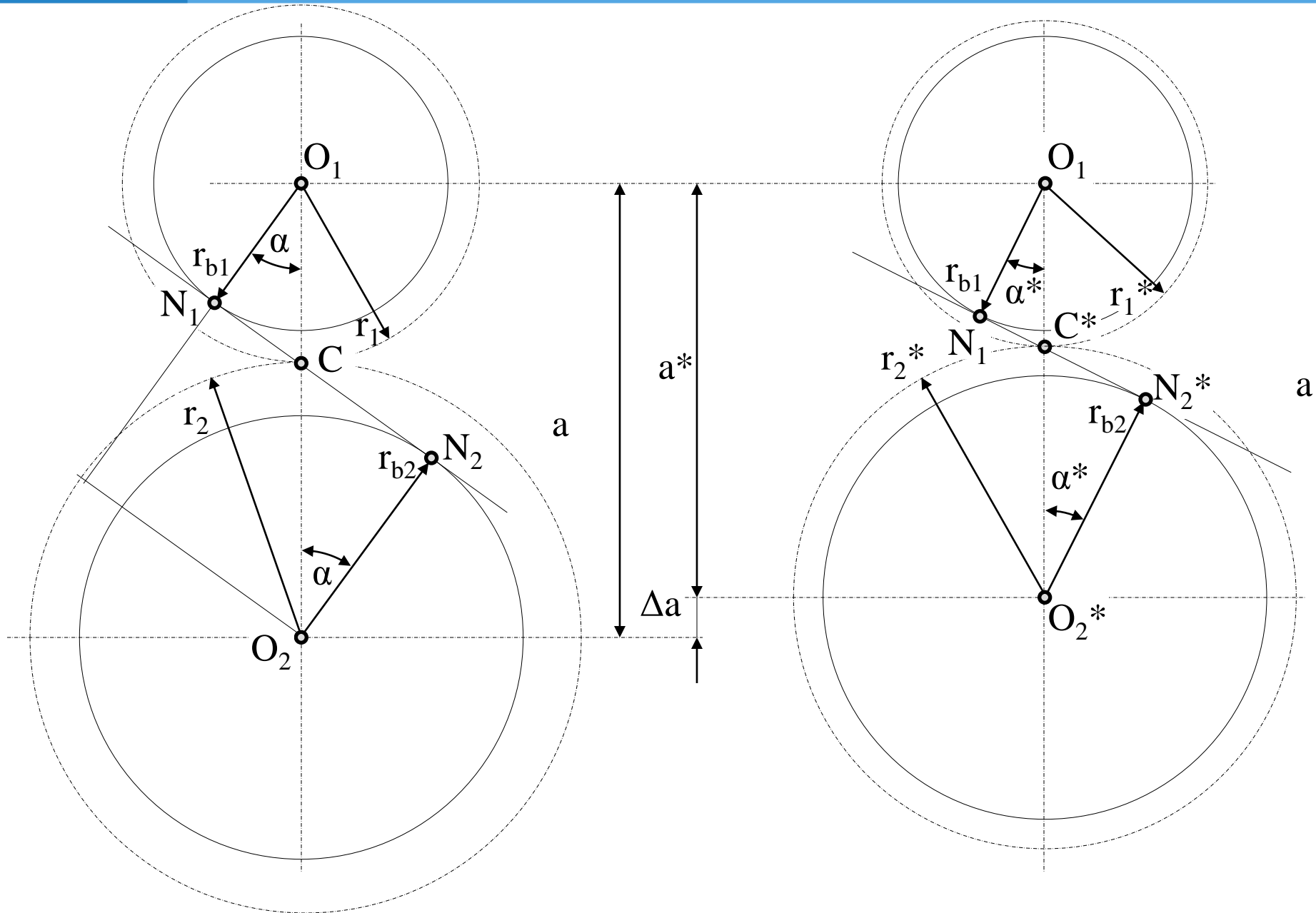


Osnovni krog je krog po katerem kotalimo premico, katere točka opiše evolvento.

$$r_b = r \cdot \cos \alpha$$

Premer osnovnega kroga si izberemo tako, da je kot evolvente na razdelnem krogu npr.  $20^\circ$ !

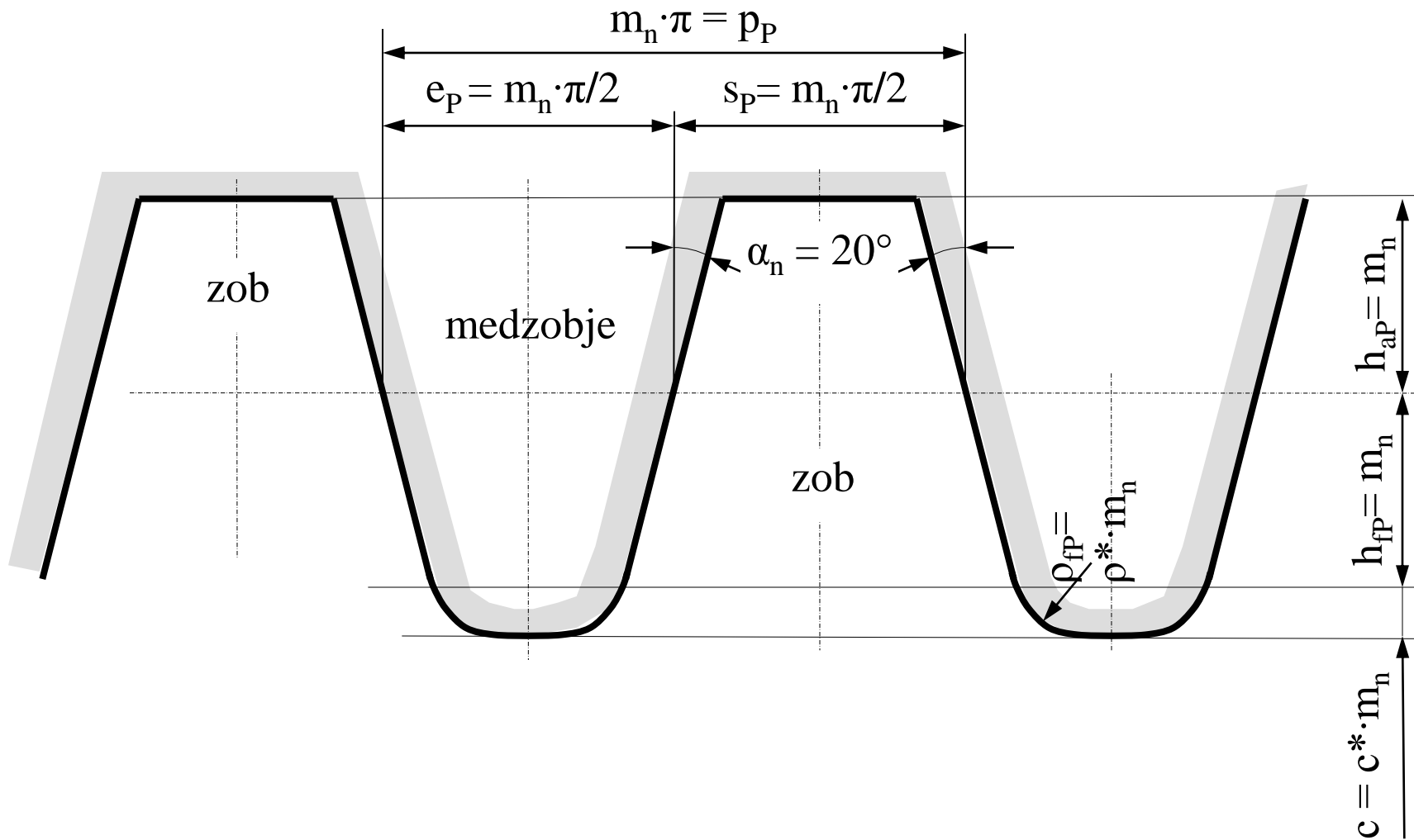




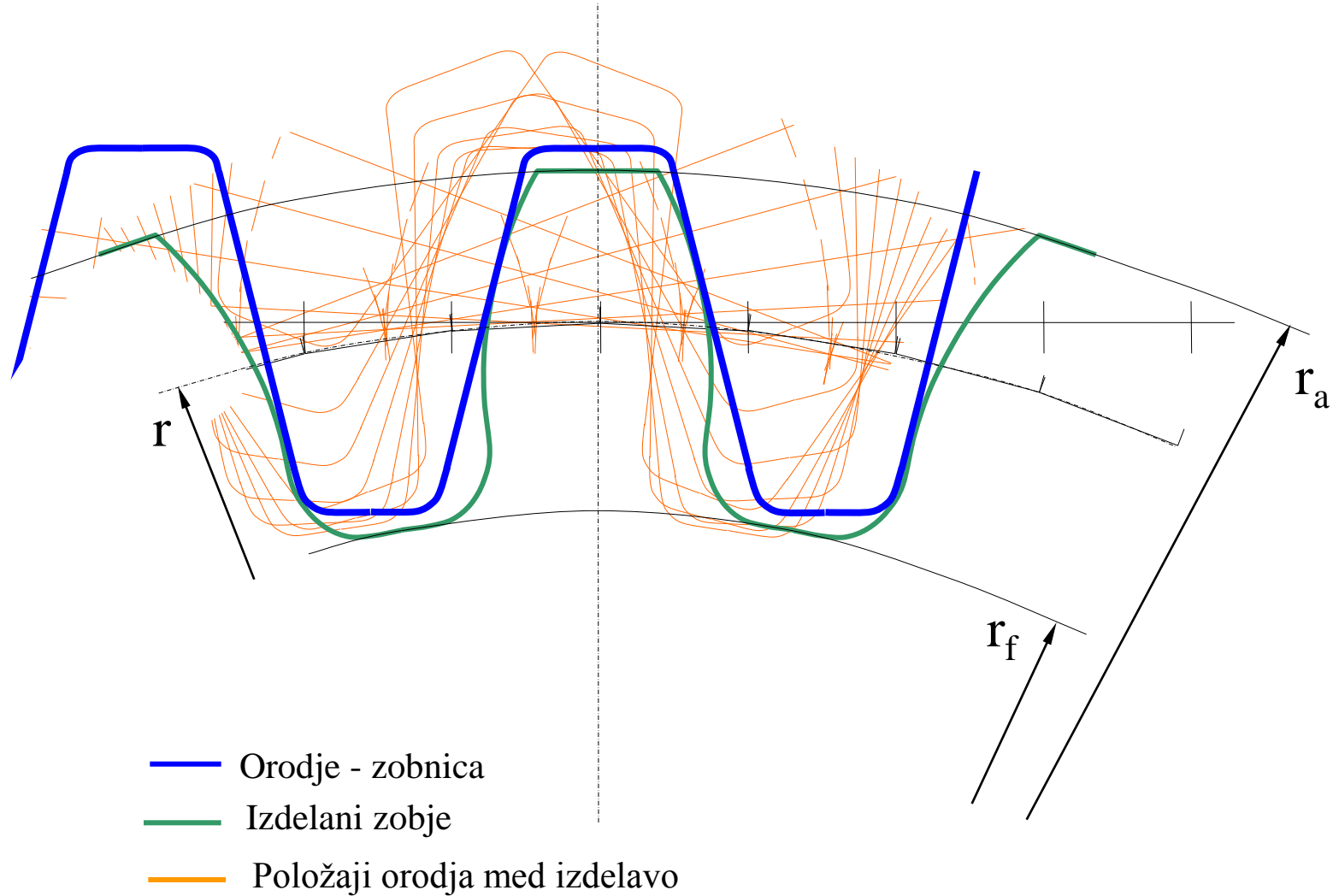


# Izdelava zobnika z zobnico

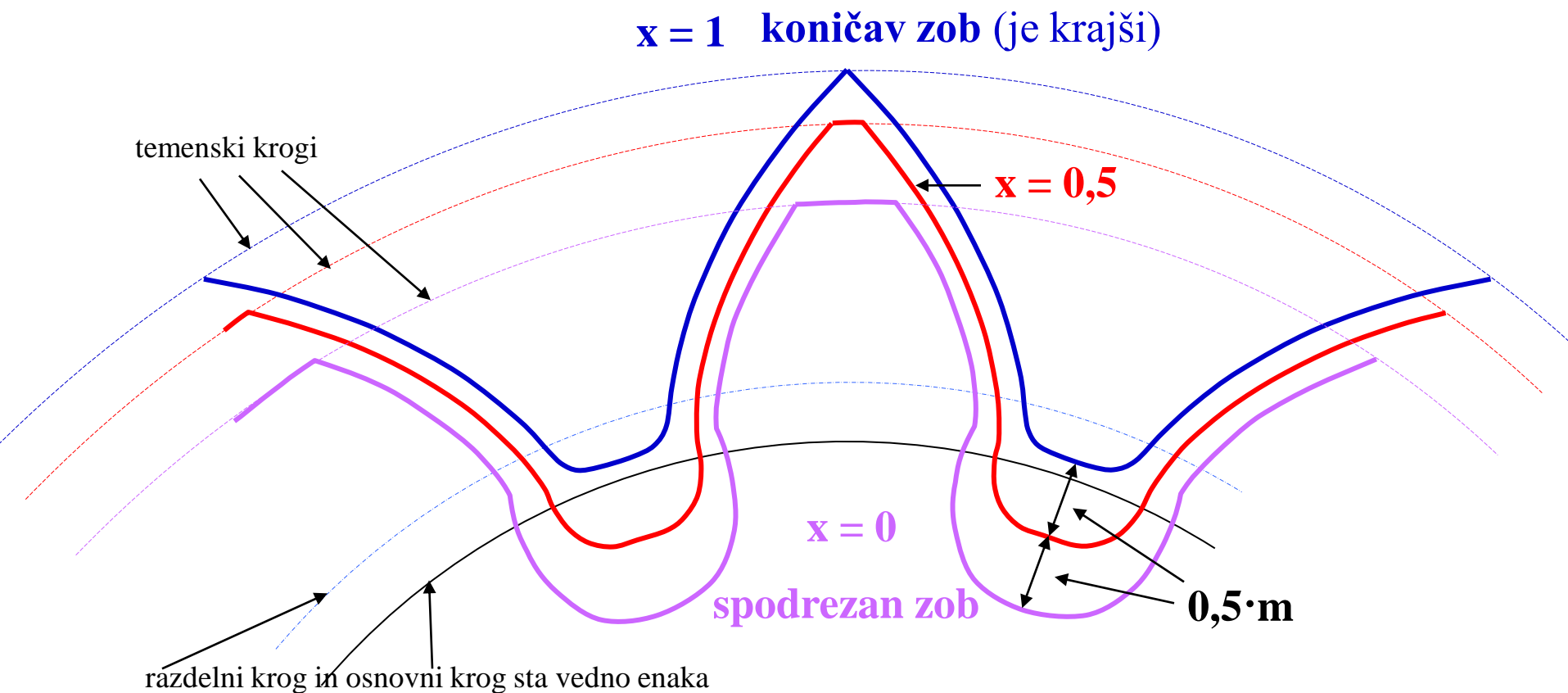
## Osnovni profil – zobata letev (DIN867)



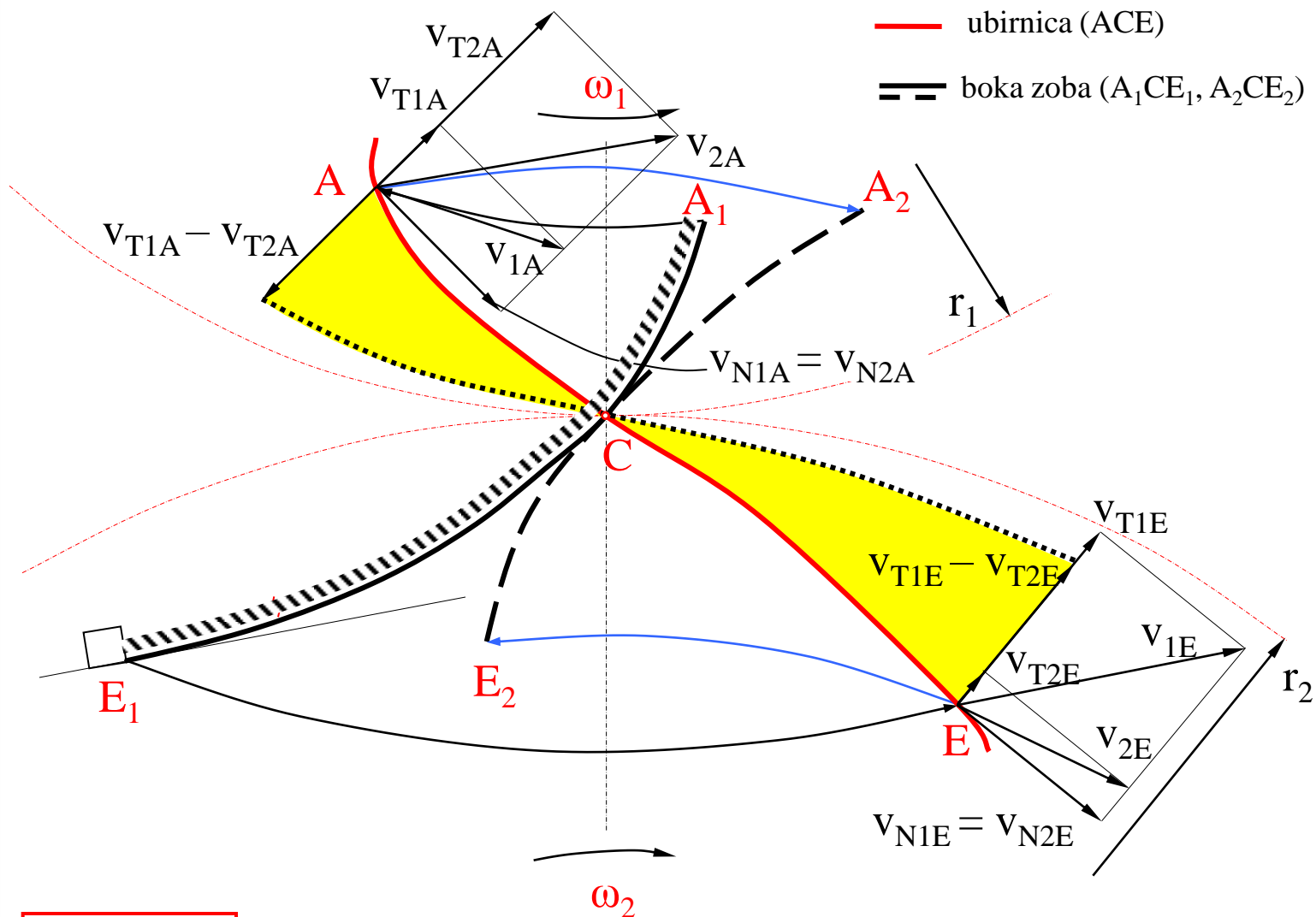
# Izdelava zobnika z zobnico



# Vpliv profilnega premika na obliko zoba in velikost zobnika ( $z = 10$ )



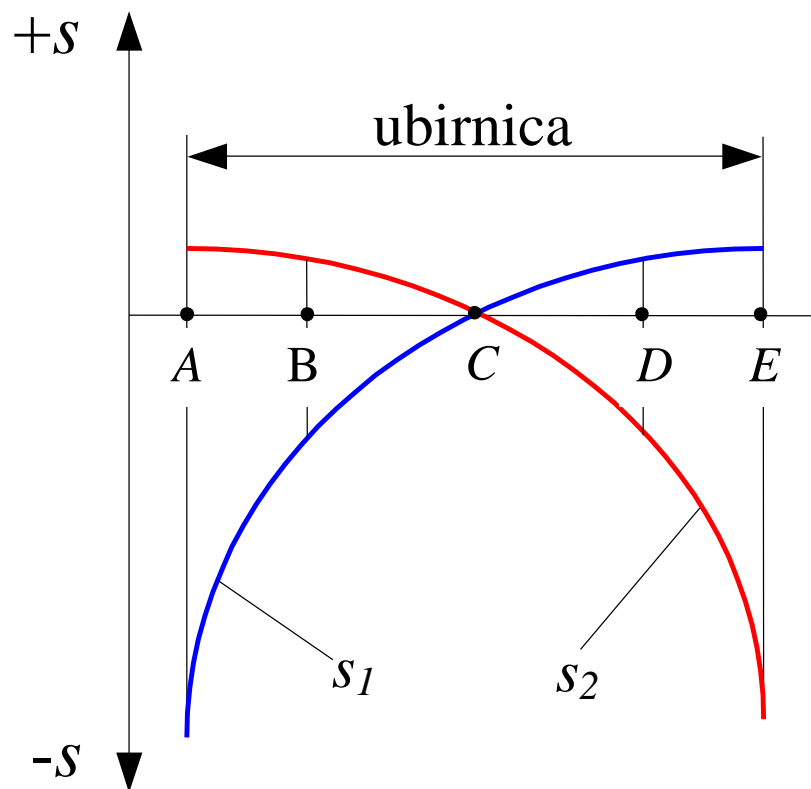
# Drsenje zobnih bokov (grafično določanje hitrosti drsenja)



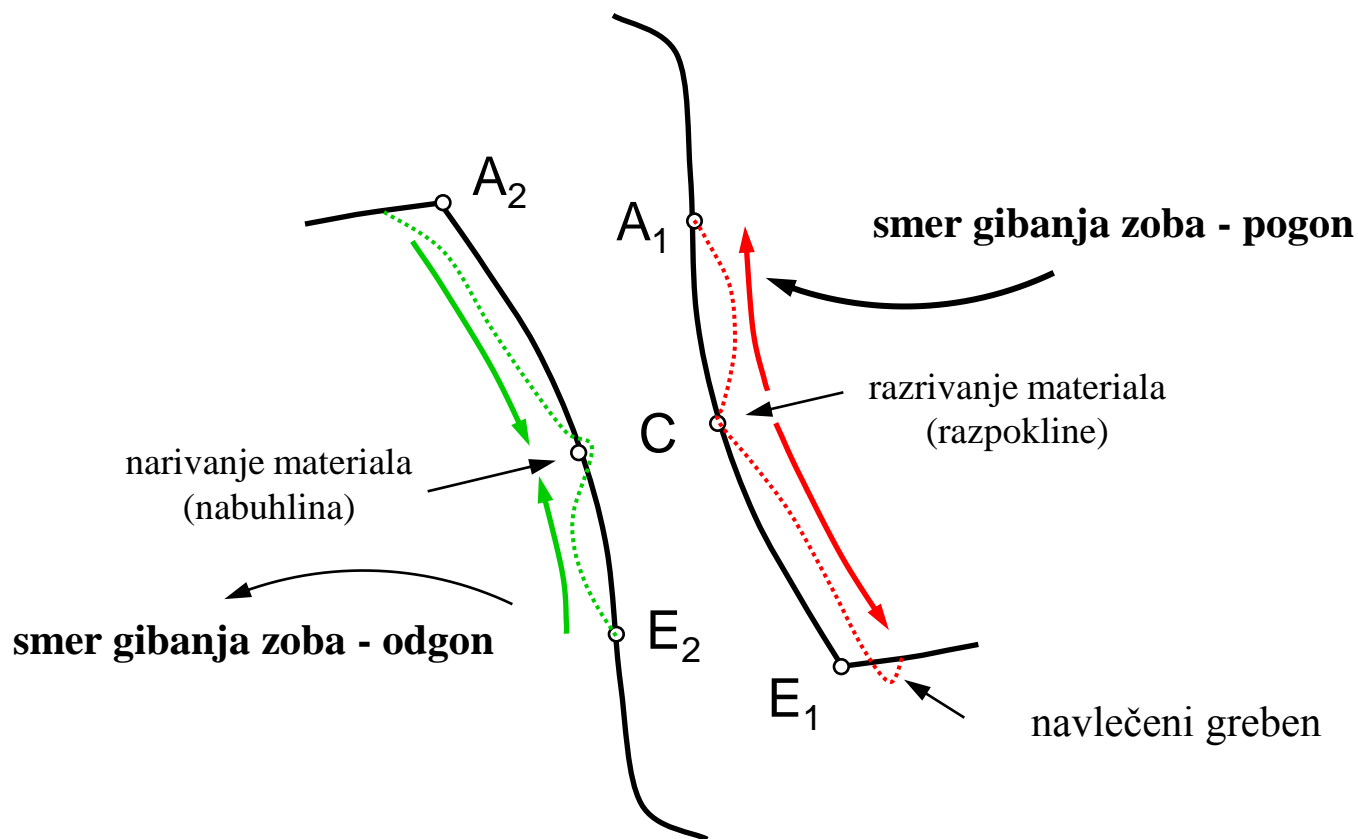
$v_T = v_{T1} - v_{T2}$  hitrost drsenja boka po boku

diagram hitrosti drsenja med bokoma ( $v_{T1} - v_{T2}$ )



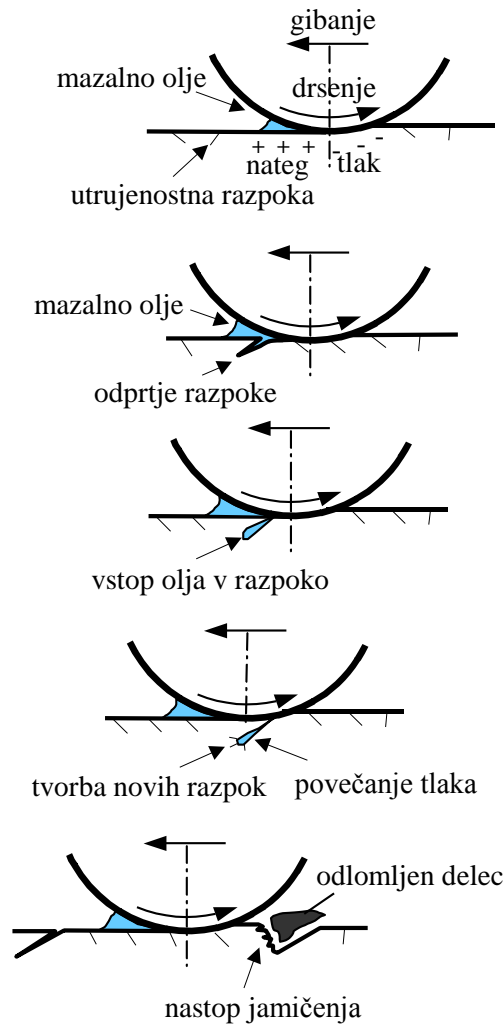


# Smeri drsenja zobnih bokov Obraba zaradi drsenja zobnih bokov

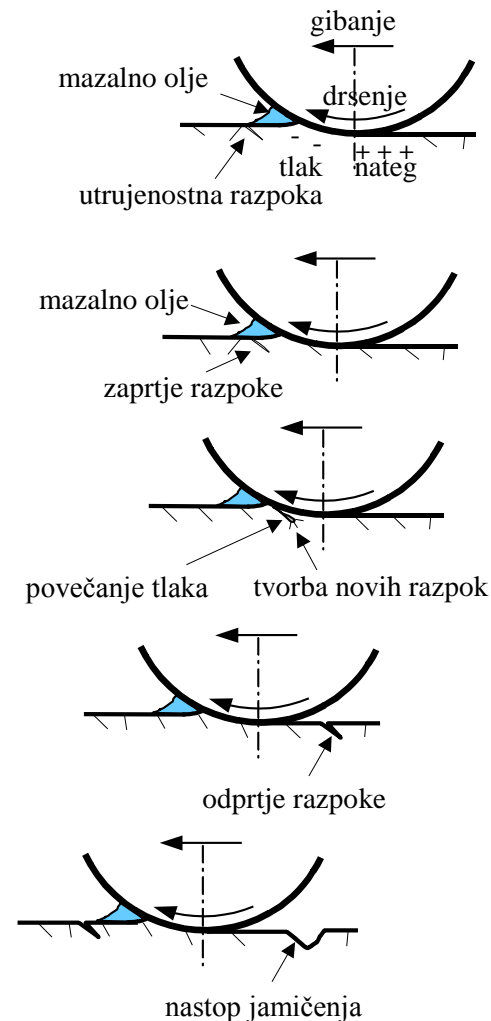


# Vpliv specifičnega drsenja na razmere v kotalno-drsemem kontaktu

## NEGATIVNO SPECIFIČNO DRSENJE

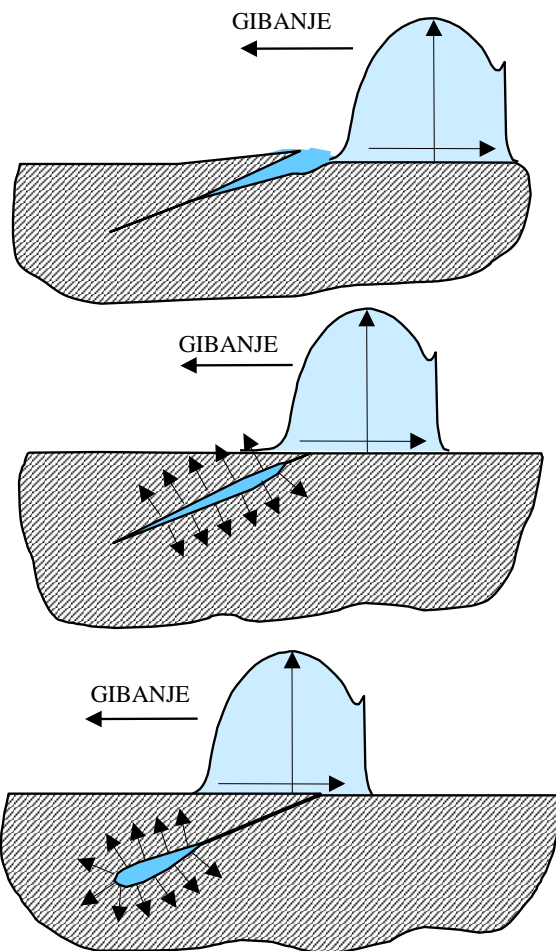


## POZITIVNO SPECIFIČNO DRSENJE



Vir: Flašker/Pehan. Prenosniki moči







# Jamičenje površin bokov zoba

