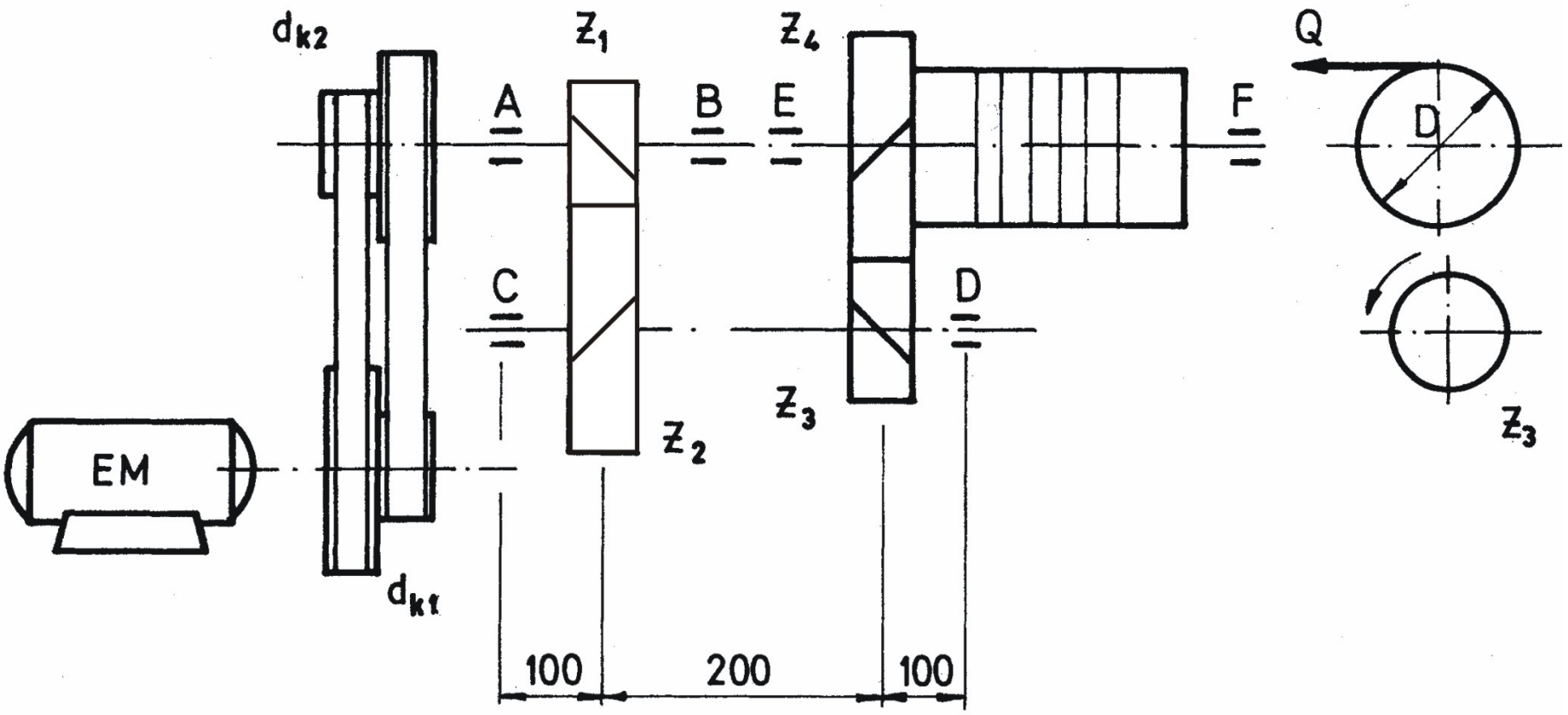
Elektromotor P=7(kW), podiže teret preko otvorenog kaišnog prenosnika, dvostepenog zupčanog para sa evolventnim zupčanicima $\alpha_0$=20°; $\beta_{03\text{-}4}$=11°; $\beta_{01\text{-}2}$=25°; $u_{1\text{-}2}=u_{3\text{-}4}$=5 i doboša za namotavanje užeta D=250(mm). Stepen iskorišćewa kaišnog prenosnika je 0,92 a zupčanog para je 0,98.

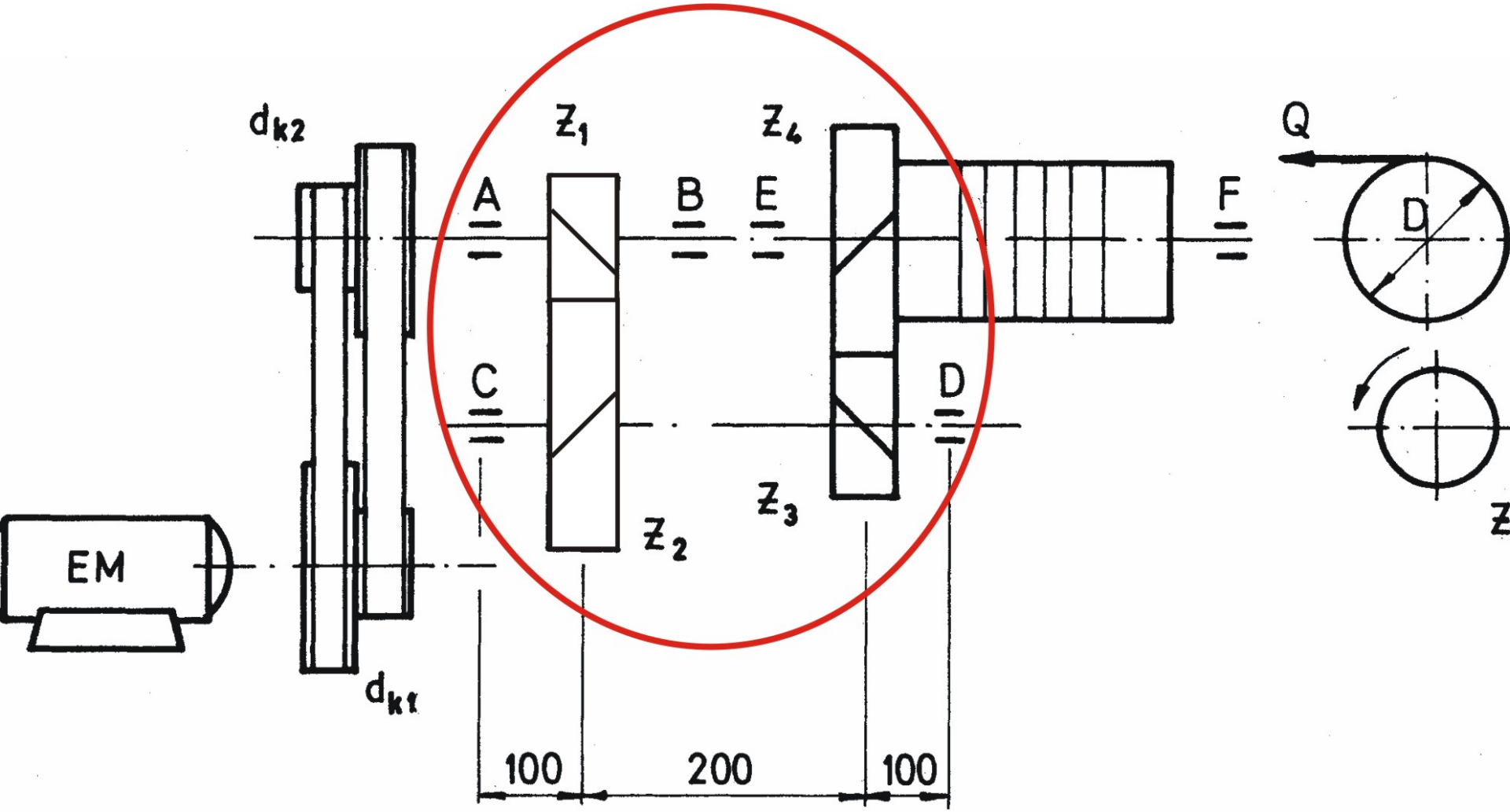

$d_{k2}$
$z_1$
$z_4$
Q
A
B
E
F
D
C
D
EM
$z_2$
$z_3$
$z_3$
$d_{k1}$
100
200
100

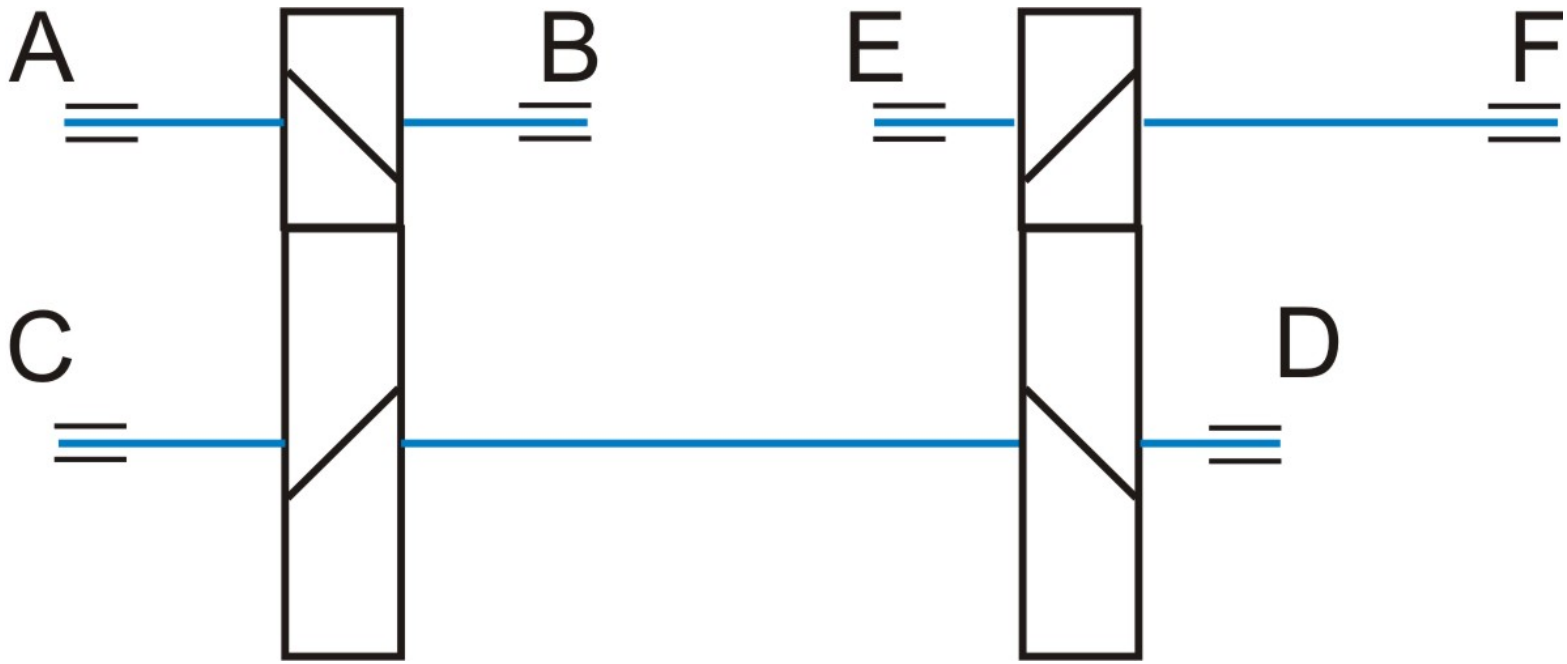
# U zadatku treba:

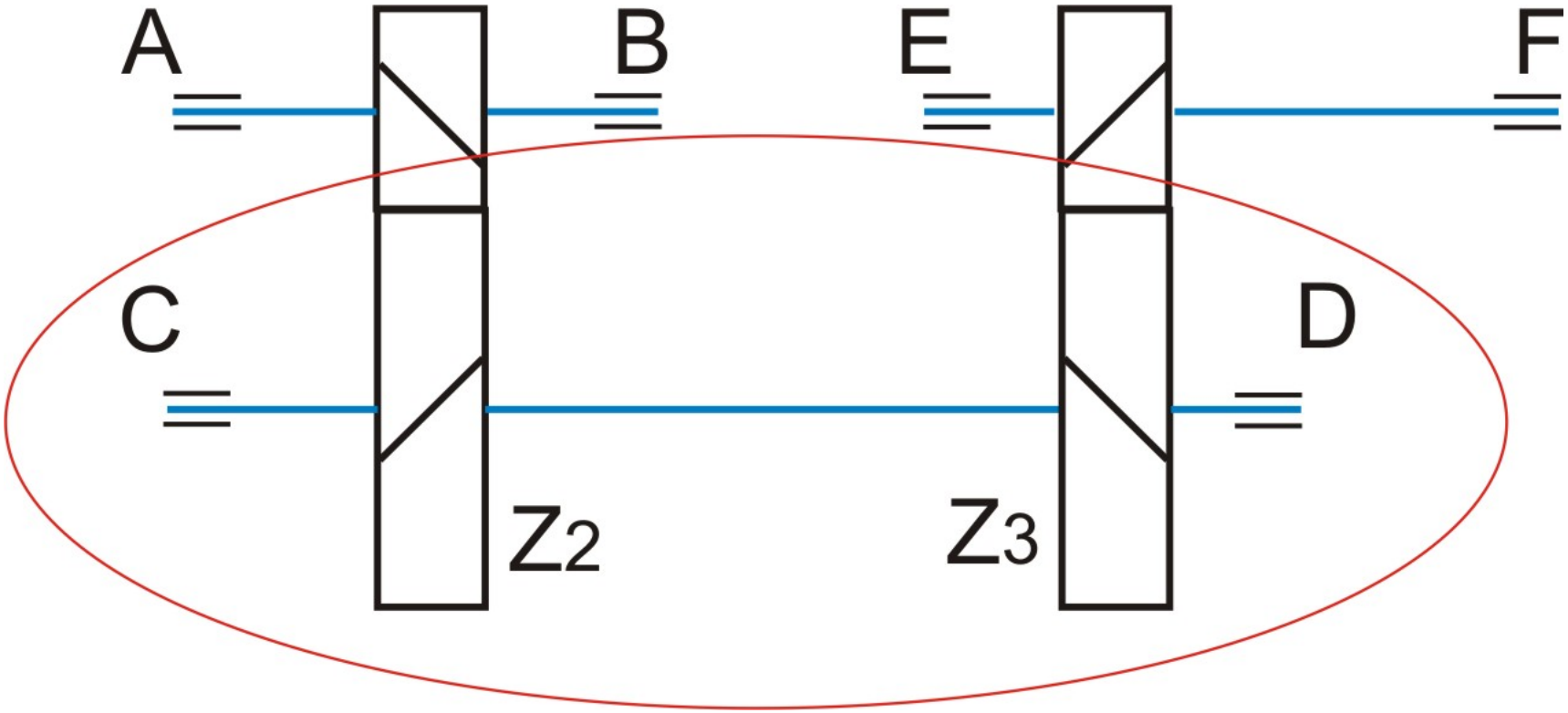
2) Nacrtati šemu opterećenja vratila na kome se nalaze zupčanici $z_2$ i $z_3$ i izračunati intenzitete sila koje opterećuju vratilo ako je: $z_1$=17; $m_{n1\text{-}2}$=4(mm); $d_3$=110(mm) prenosnik je u horizontalnici.
3) Dimenzionisati vratilo prenosnika na kome se nalaze zupčanici $z_2$ i $z_3$ . Materijal za izradu vratila je Č.0545.

# Prenosnik je u horizontalnici

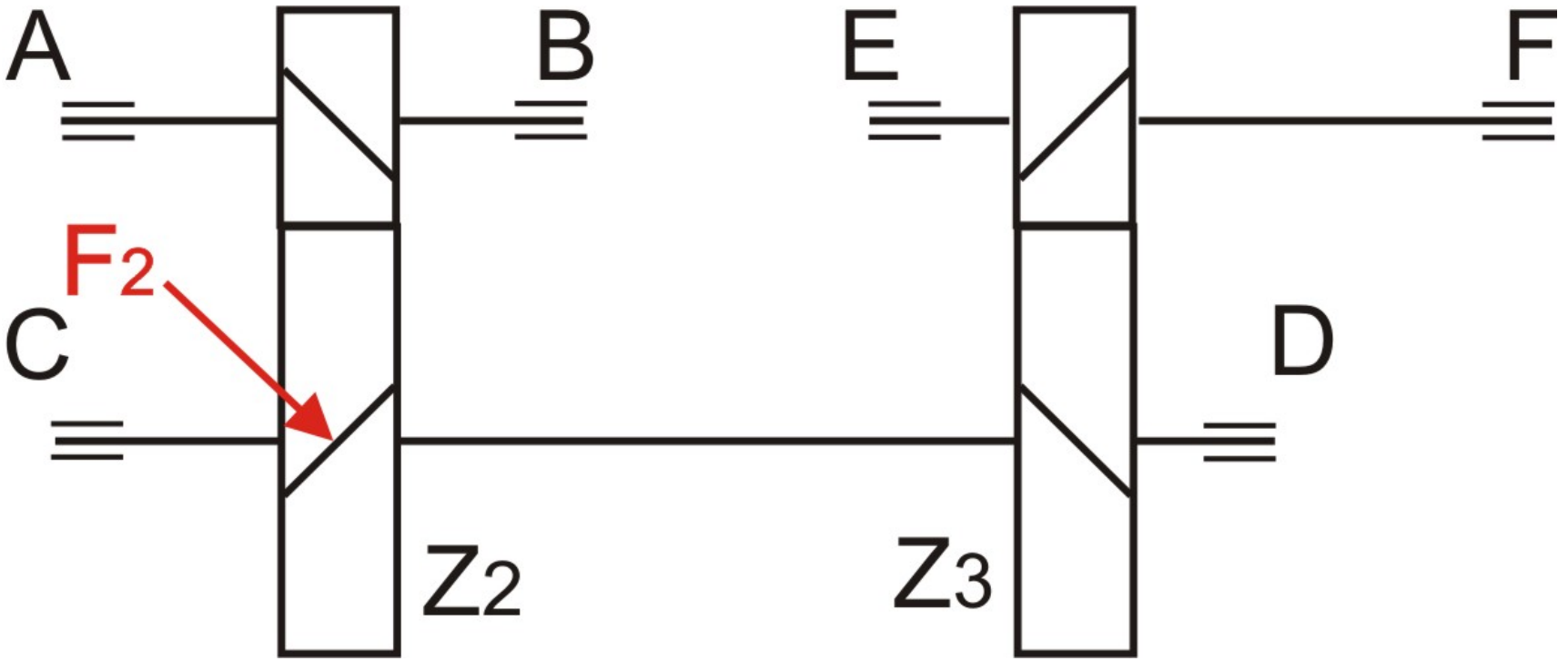
⇨ Fa i Fr deluju u “H”, a Fo u “V”




A
B
E
F
C
D

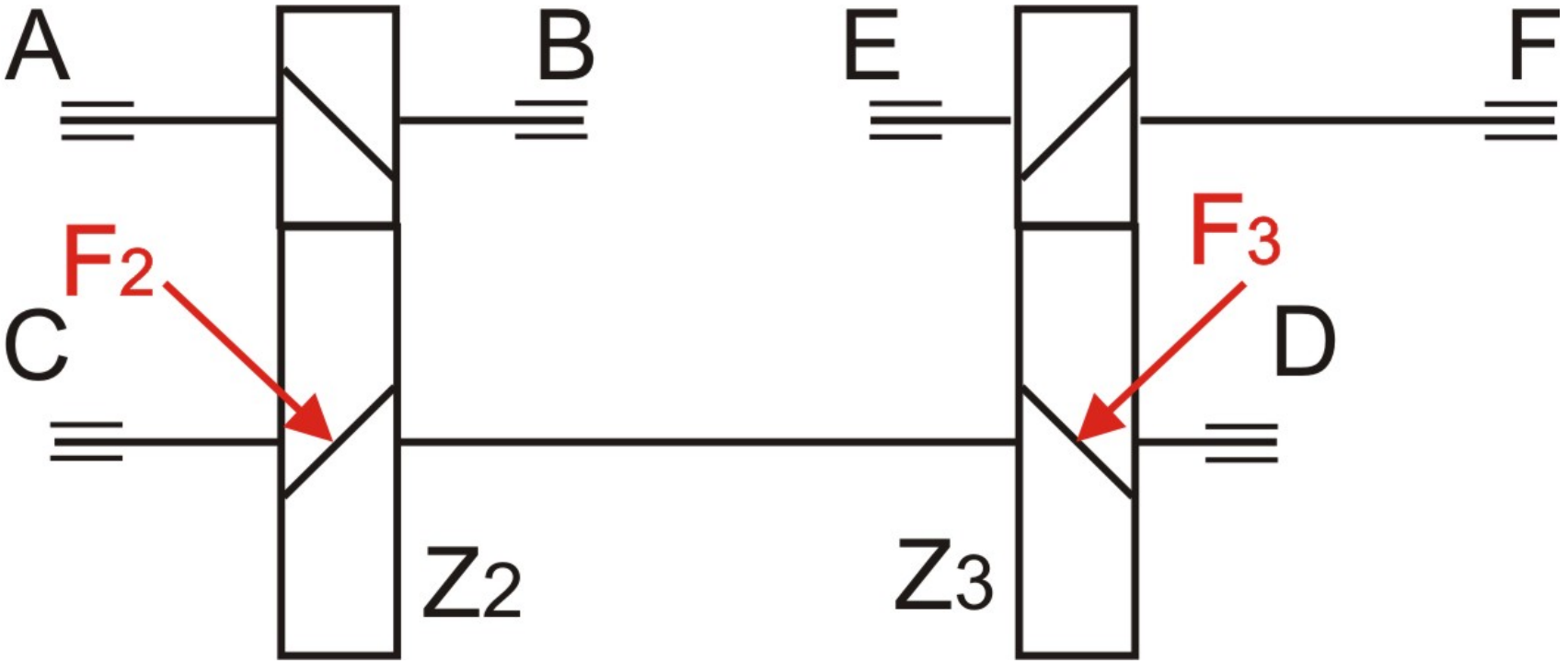

A
B
E
F
C
D
Z2
Z3

# Prenosnik u “H” ⇨ Fr i Fa su u “H”

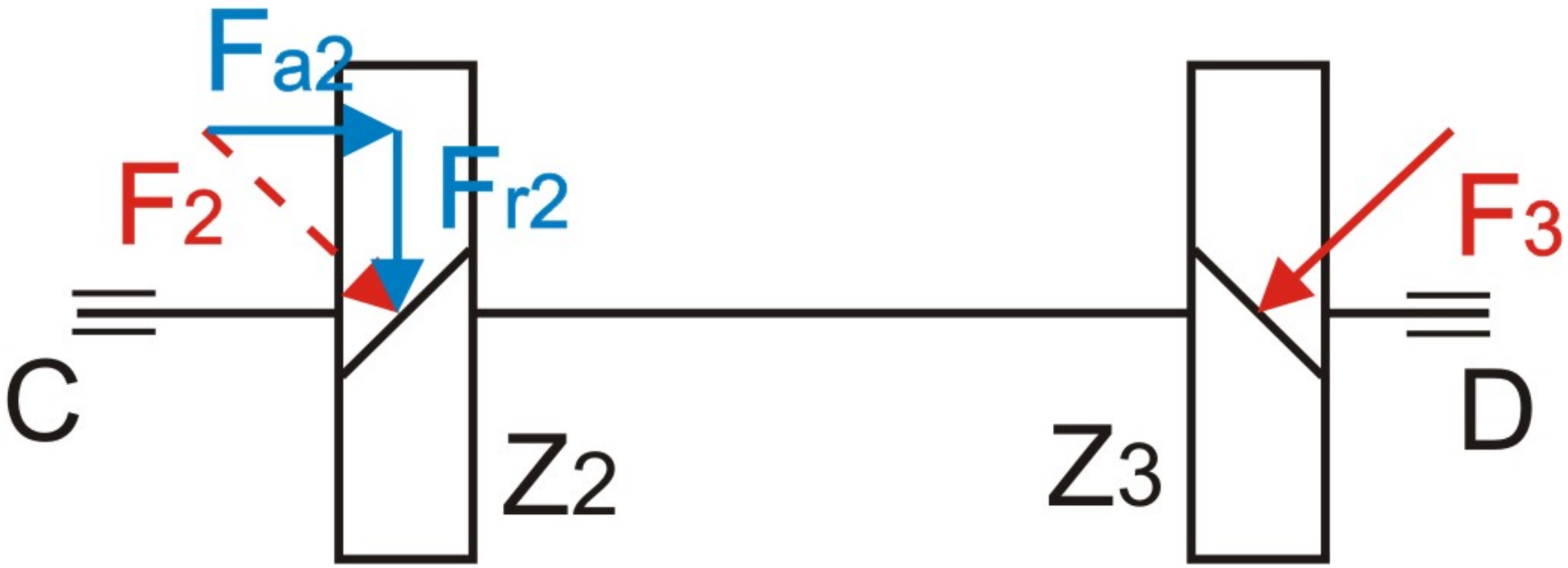


# Prenosnik u “H” ⇨ Fr i Fa su u “H”

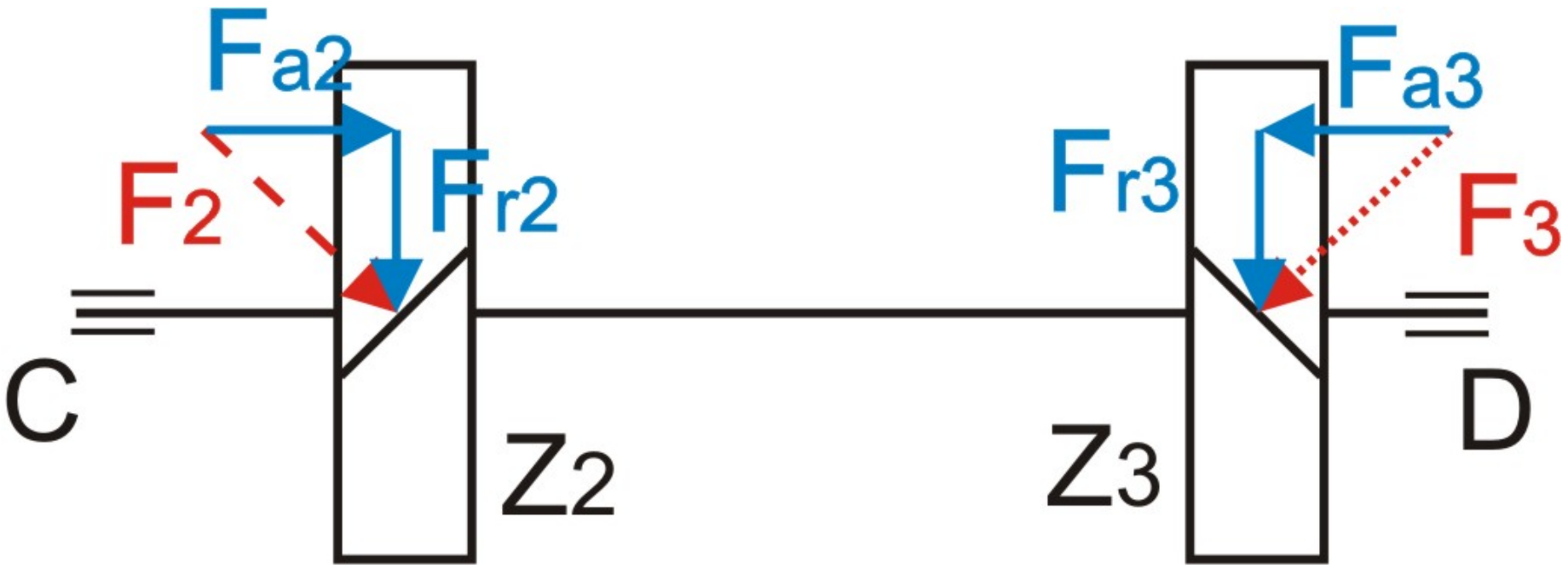
(odakle dolazi pritisak na zupčanik?)



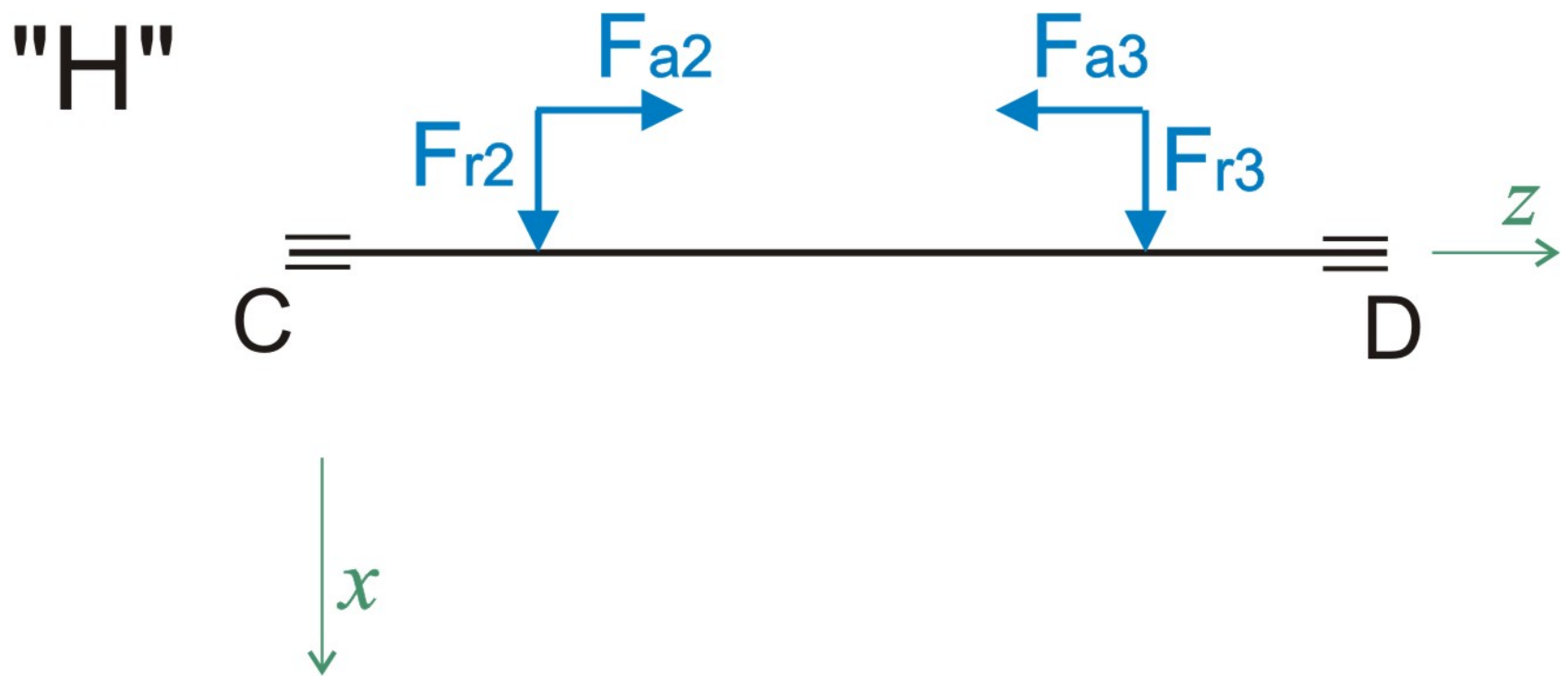
# Razlažemo silu na askijalnu i radijalnu komponentu



# Razlažemo silu na askijalnu i radijalnu komponentu

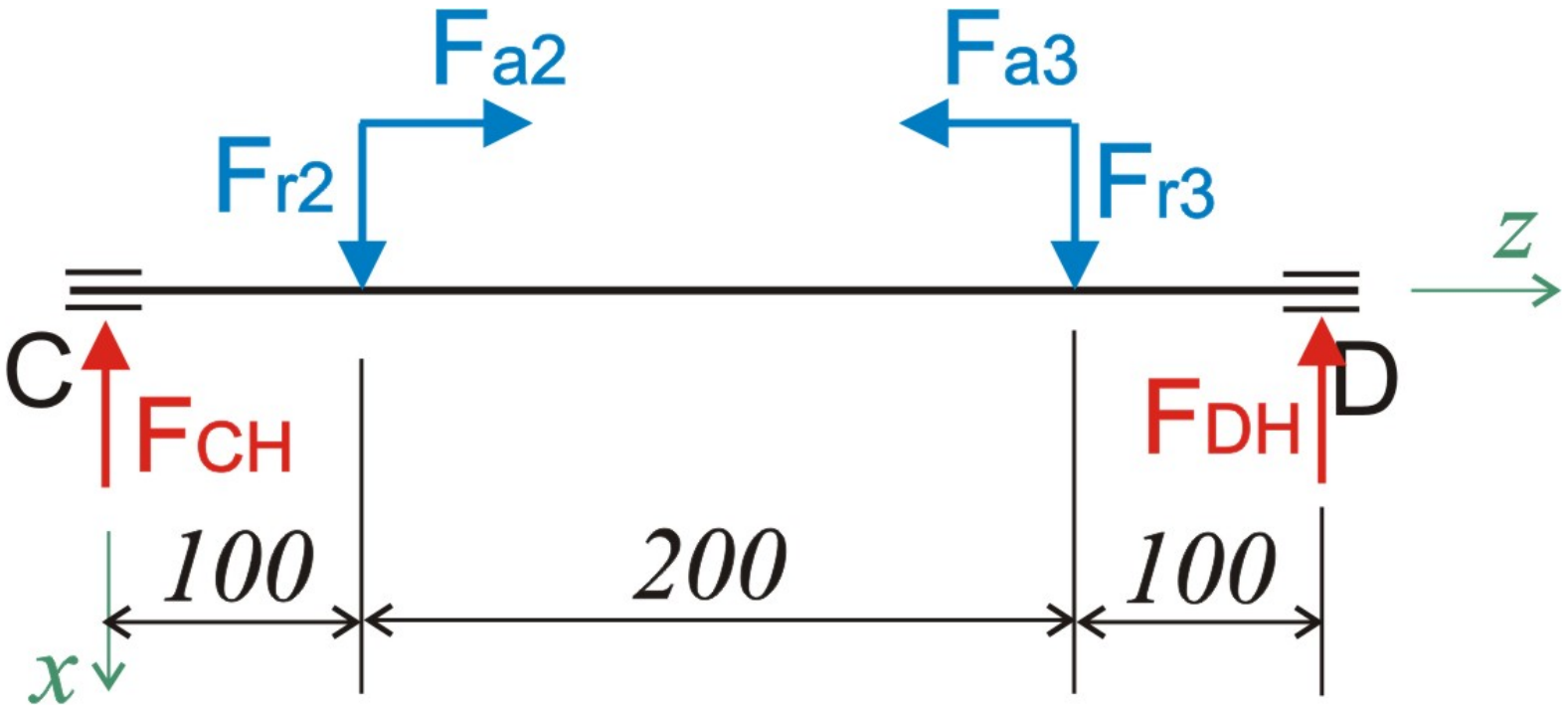


# Šema opterećenja vratila CD u “H”

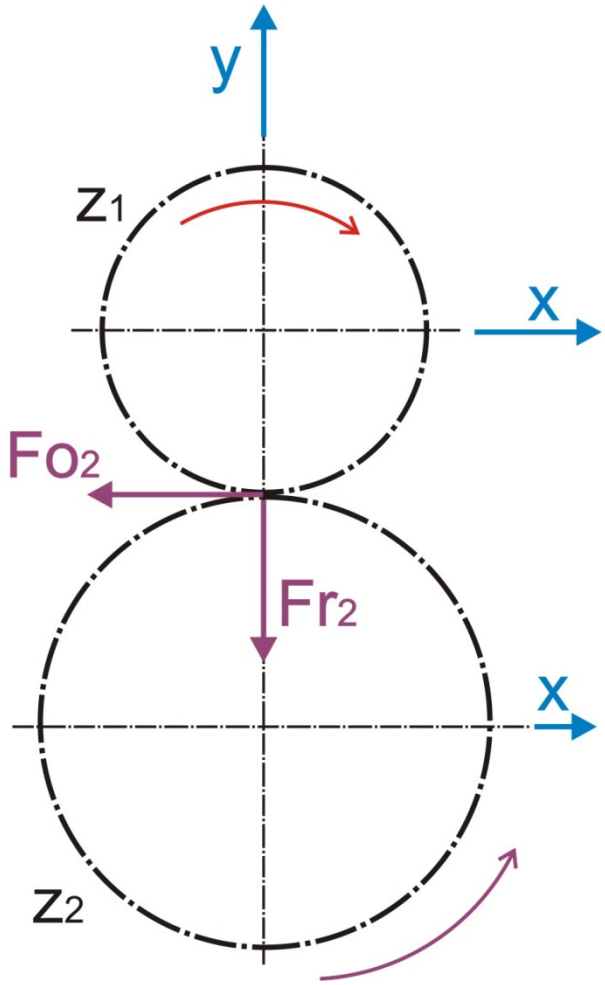


# Šema opterećenja vratila CD u “H”

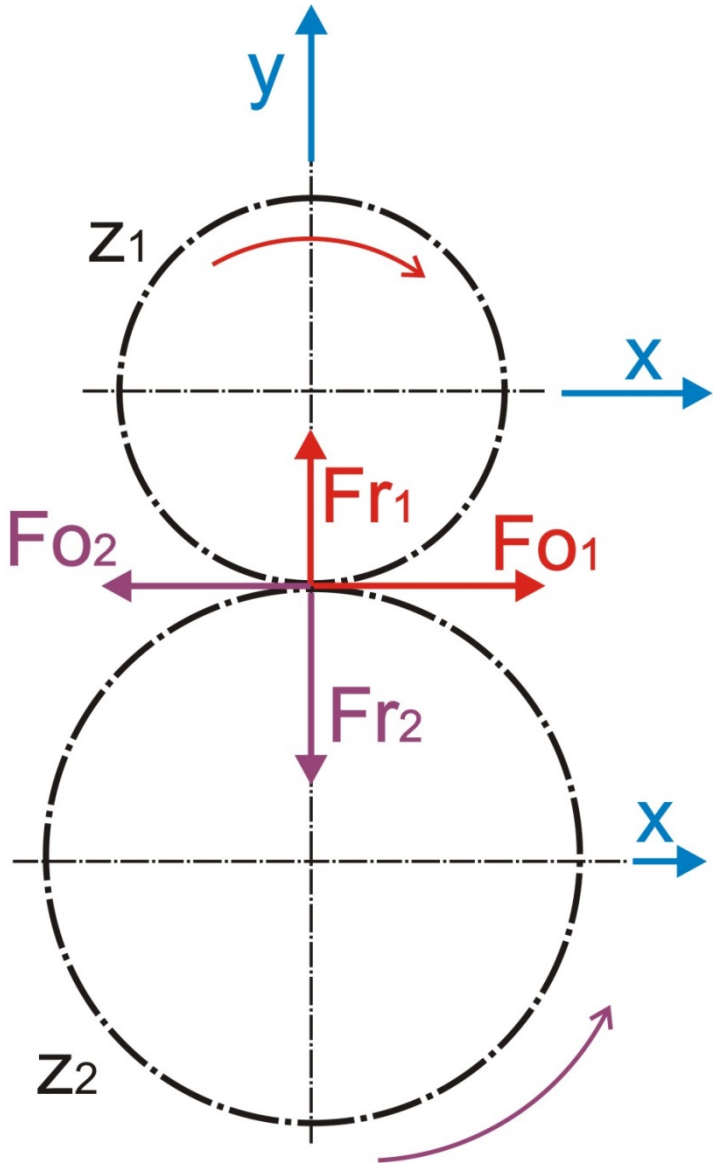
"H"



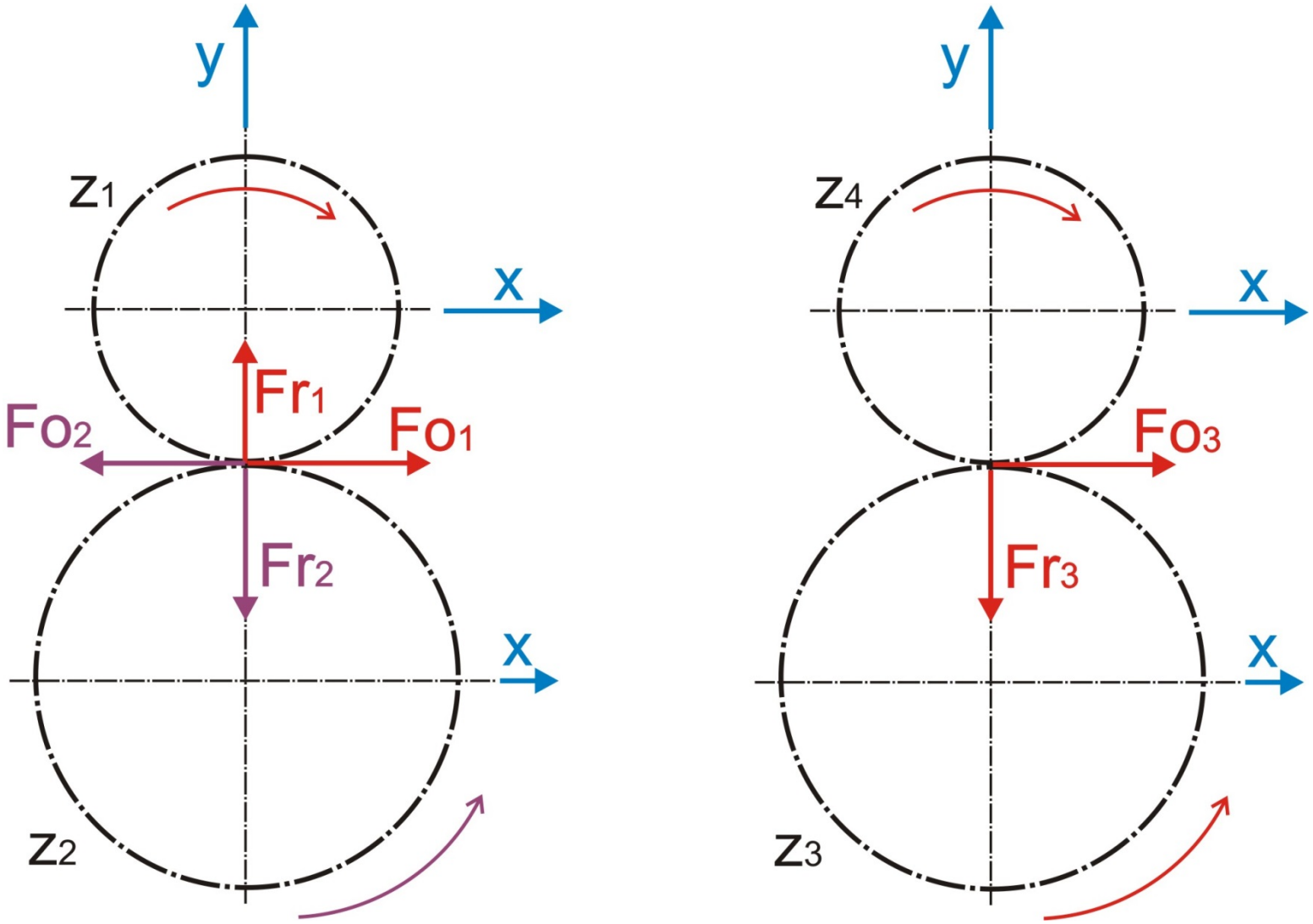
# Prenosnik u “H” ⇨ Fo je u “V”



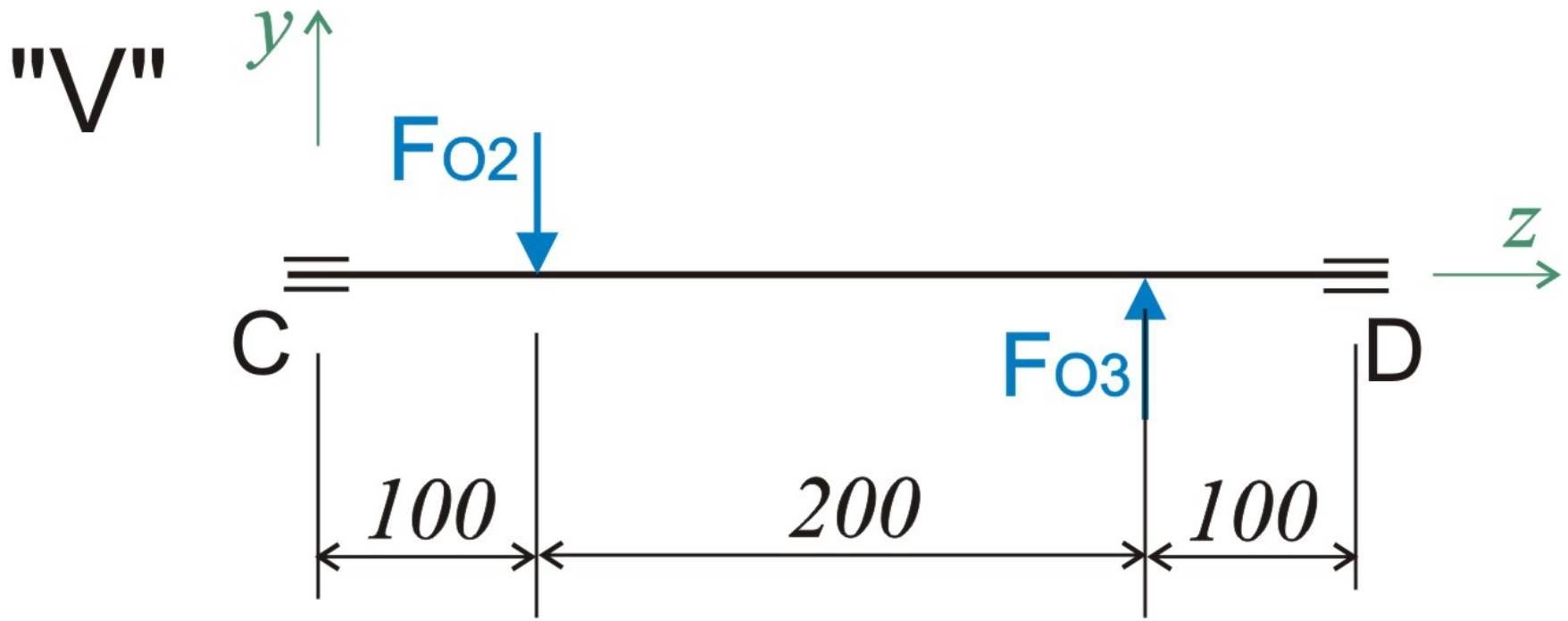
# Prenosnik u “H” ⇨ Fo je u “V”



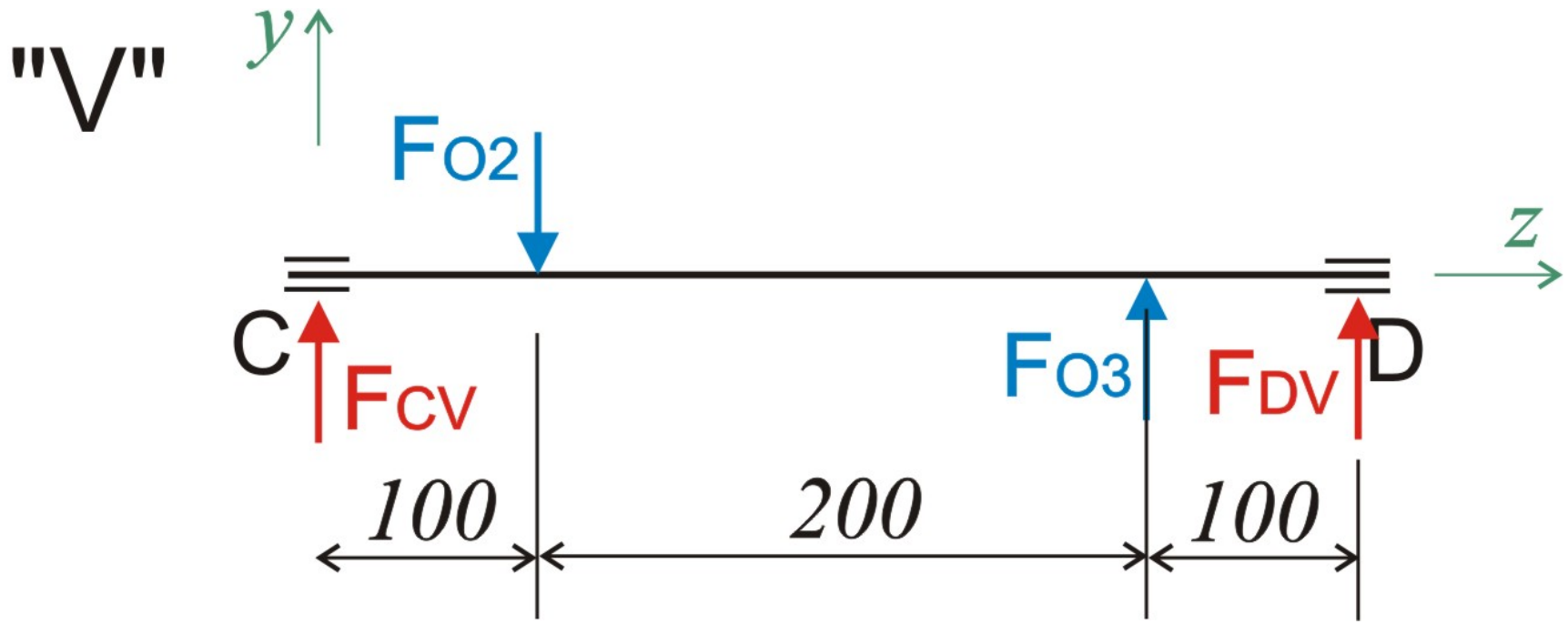
# Prenosnik u “H” ⇨ Fo je u “V”

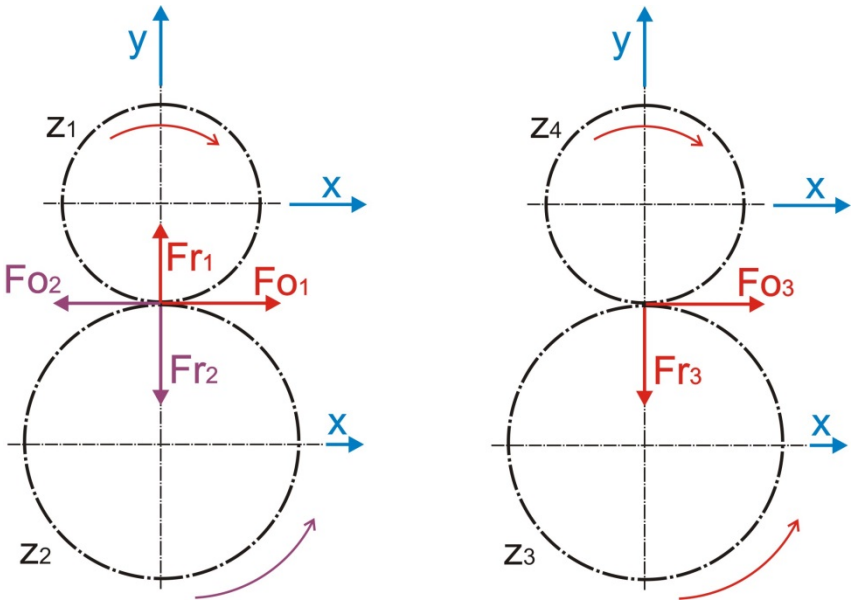


# Šema opterećenja vratila CD u “V”

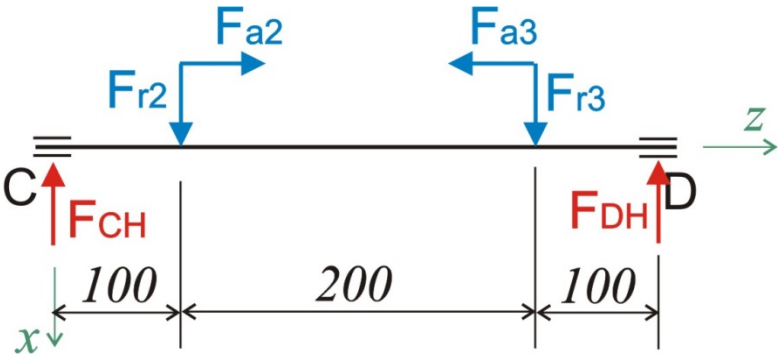


# Šema opterećenja vratila CD u “V”

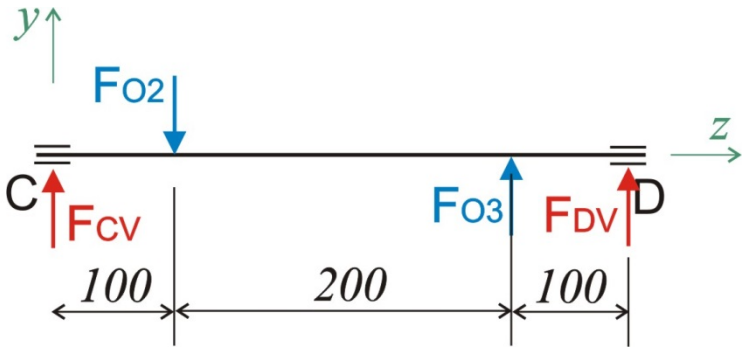



y
z1
x
Fr1
Fo2
Fo1
Fr2
x
z2
y
z4
x
Fo3
Fr3
x
z3

"H"


Fa2
Fa3
Fr2
Fr3
z
C
FCH
FDH
D
100
200
100
x

"V"


y
FO2
z
C
FCV
FO3
FDV
D
100
200
100

# Наставак задатка према решењима у Збирци, пример 7.2, стр. 293-295

- 2. Оптерећења вратила
- 3. Димензионисање вратила

Za kombinovano pužno – konični reduktor:

- 1. Izračunati snagu na spojnici $S_2$
- 2. Nacrtati šemu opterećenja i odrediti intenzitet sila na vratilu II (AB)
- 3. Dimenzionisati vratilo II materijala Č.0545
- 4. Izabrati ležaj u osloncu A za željeni vek T=8000h. Radna temperatura <100°C.

# Podaci:

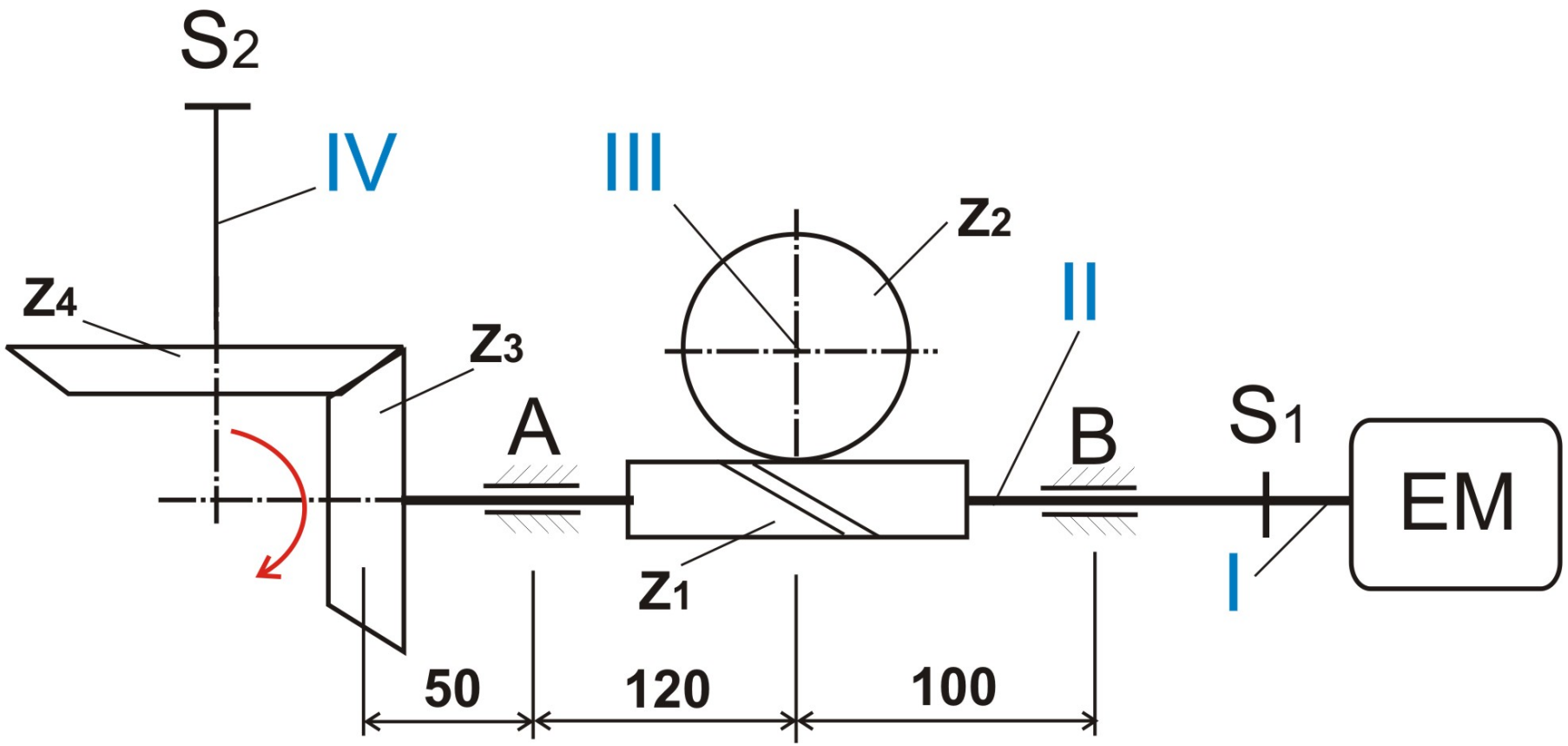
$u_{1-2} = 21$, $Z_1 = 2$, $q = 10$, $m_{1-2} = 5$ mm,

$\gamma_m = \rho$,

$u_{3-4} = 3{,}2$, $Z_3 = 19$, $\eta_{3-4} = 0{,}98$, $d_{m3} = 45$ mm,

$\alpha_n = 20°$,

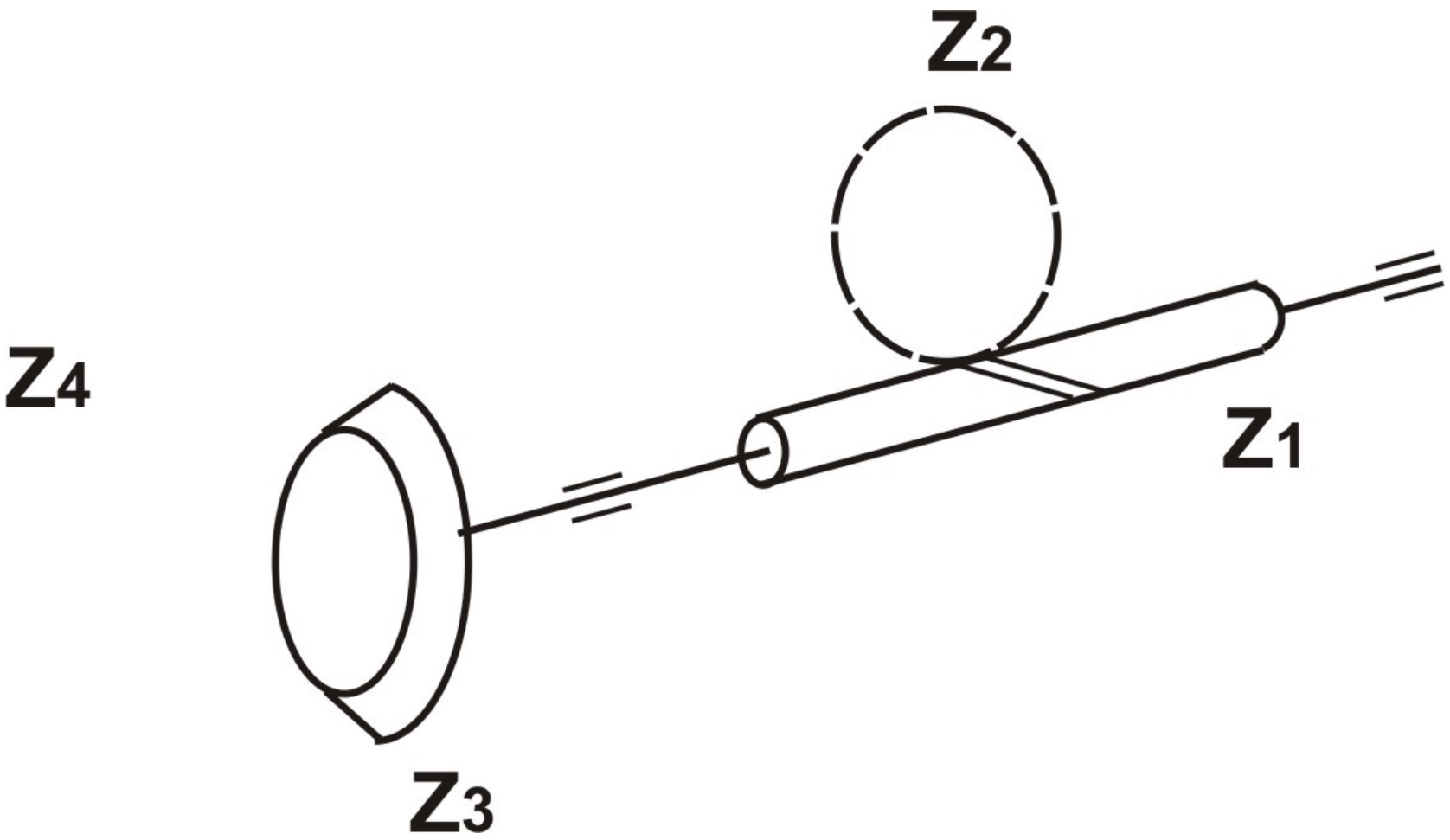
$T_2 = 670$ Nm, $P_{em} = 12$ kW, $n_{em} = 1400$ $^{min-1}$


S2
IV
III
Z2
Z4
II
Z3
A
B
S1
EM
Z1
I
50
120
100

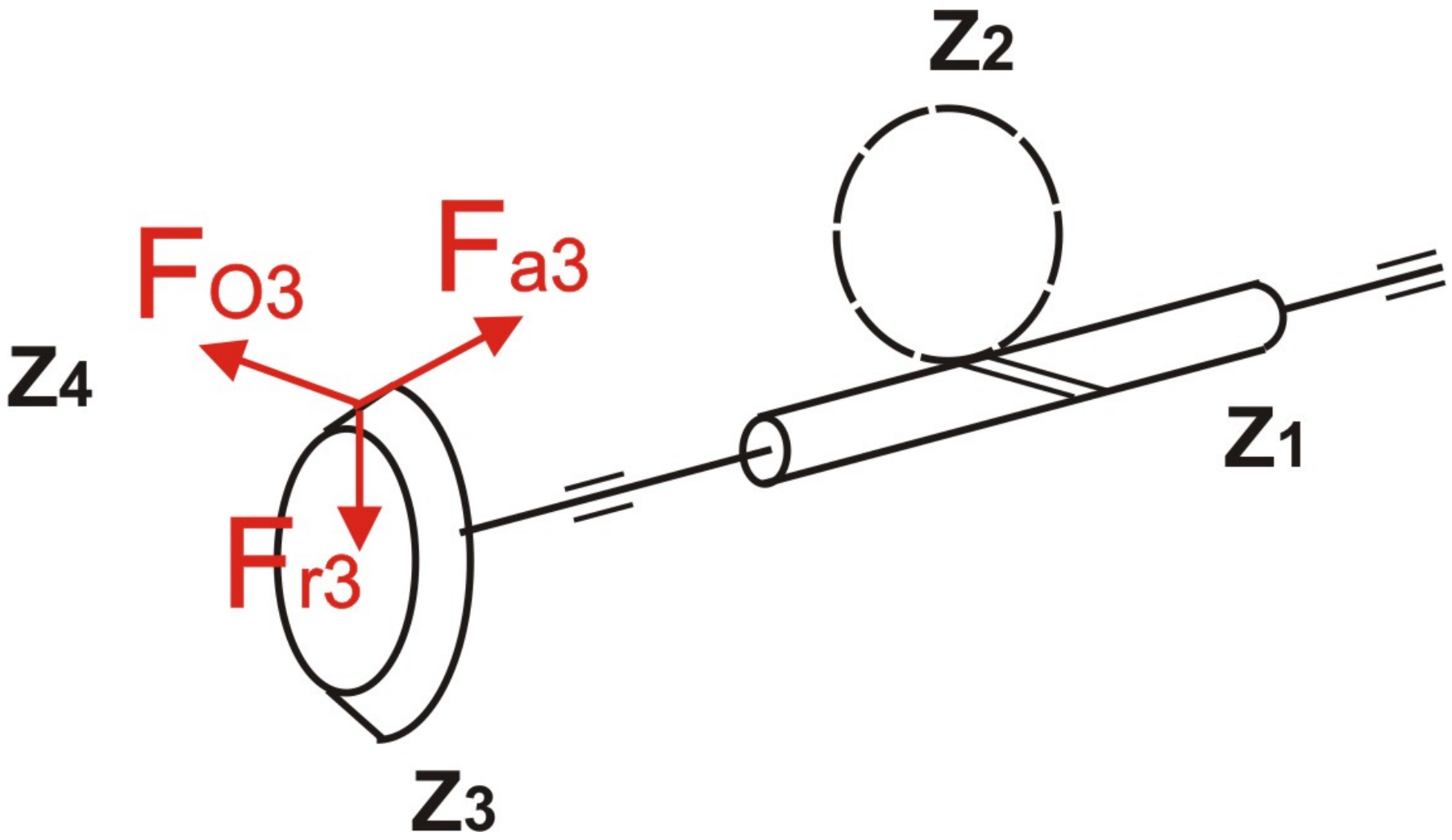
# Rešenje:

- 1. Snaga na spojnici $S_2$
- $P_{S2} = 2{,}2$ kW
- $\eta_{puž\ 1\text{-}2} = tg\ \gamma_m\ /\ tg\ (\gamma_m + \rho)$
- $tg\ \gamma_m = z_1 / q$

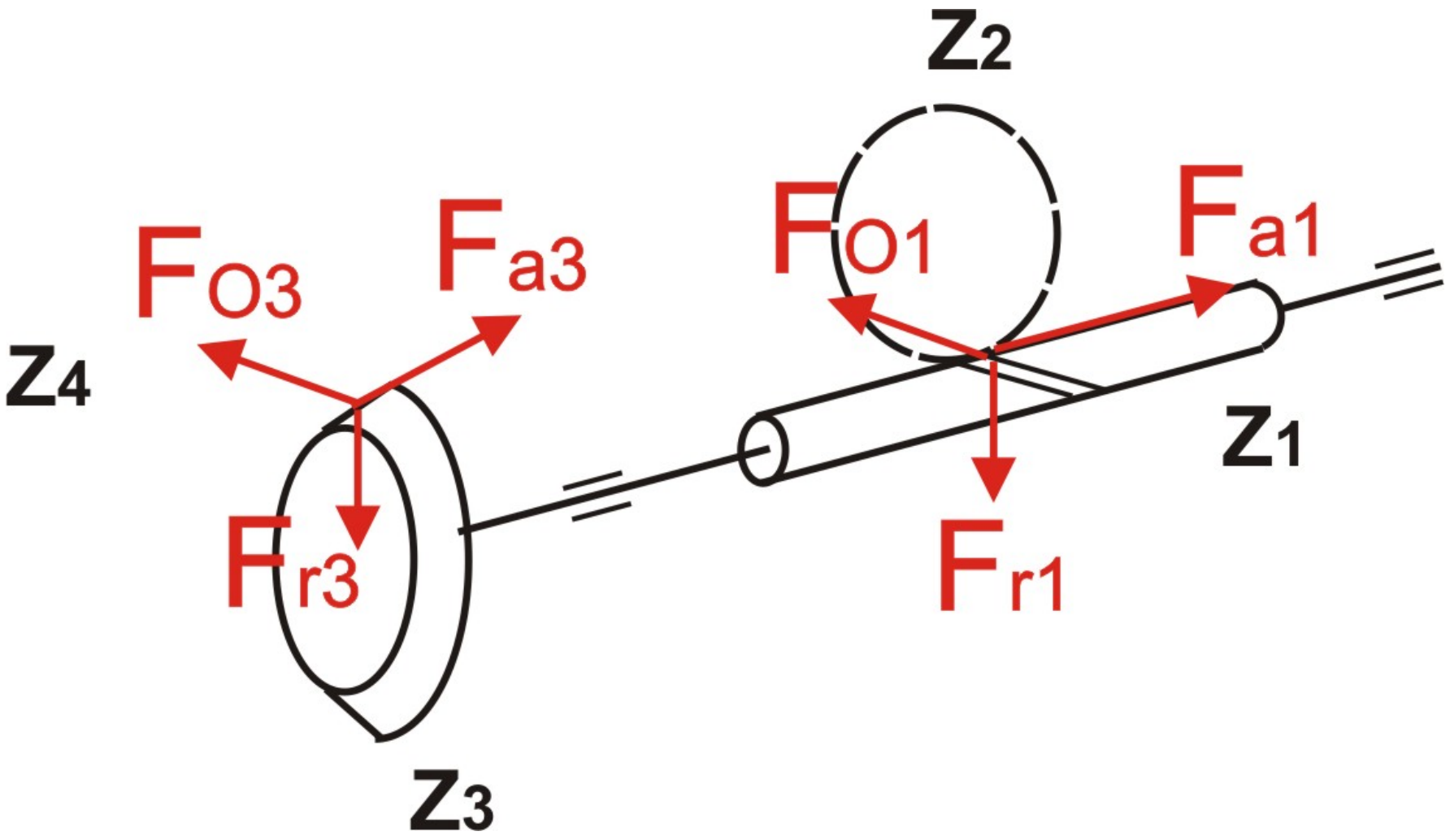
# Šema opterećenja vratila II



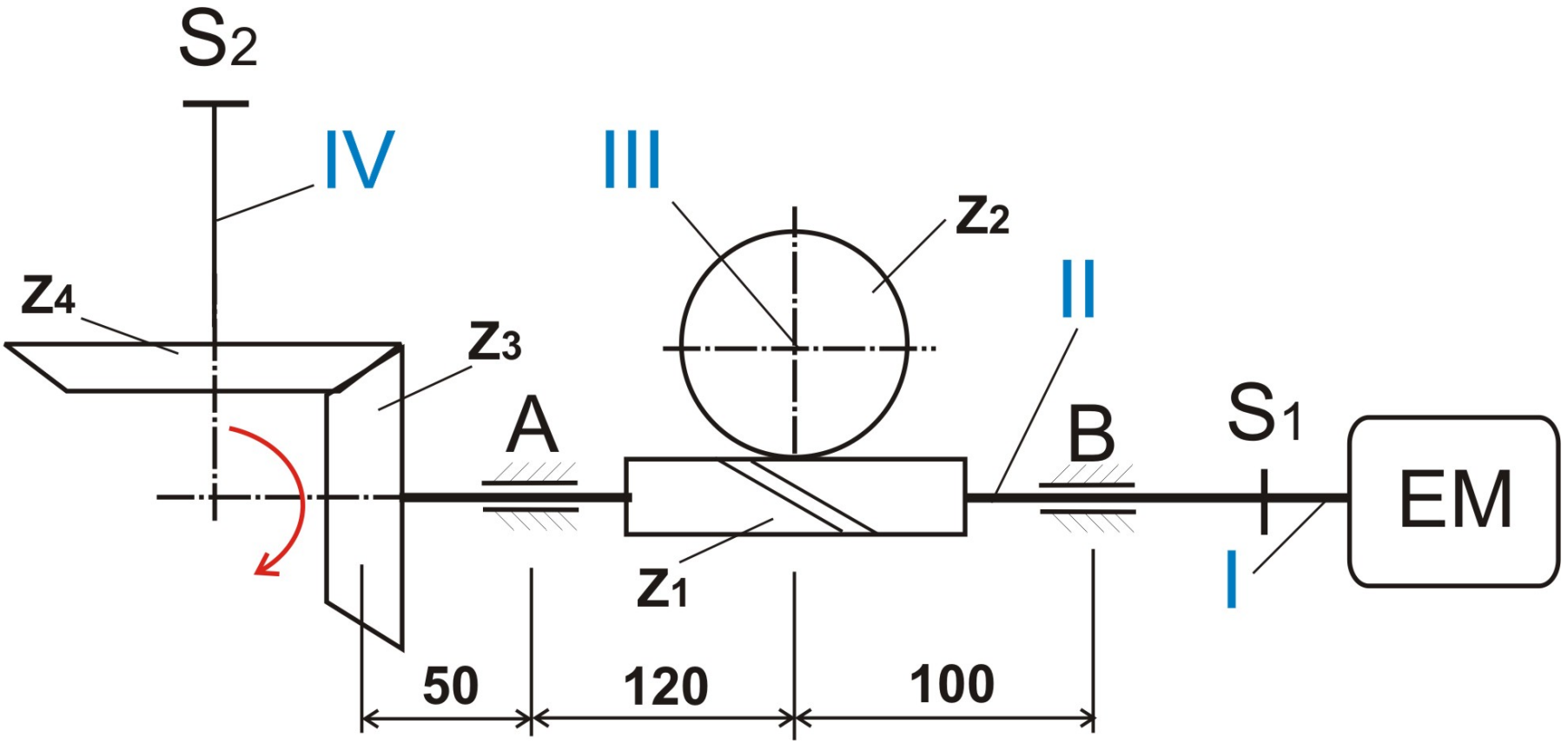
# Šema opterećenja vratila II



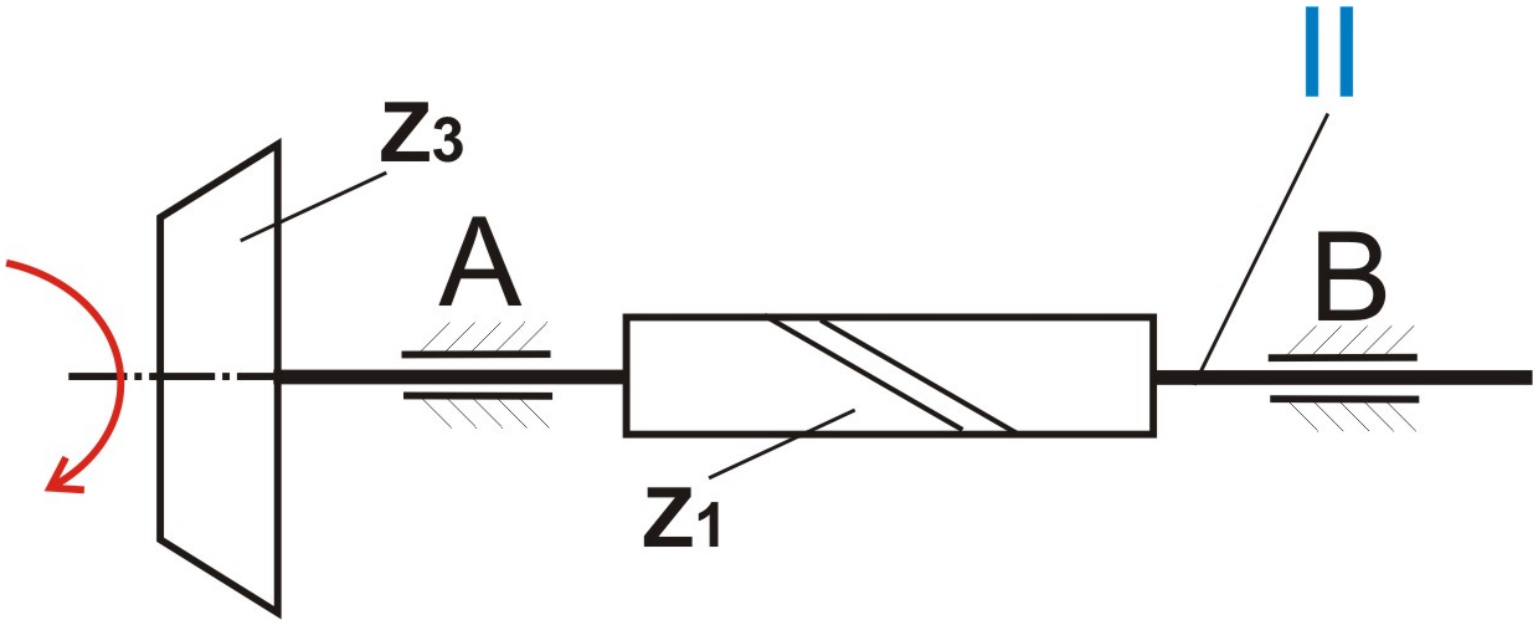
# Šema opterećenja vratila II



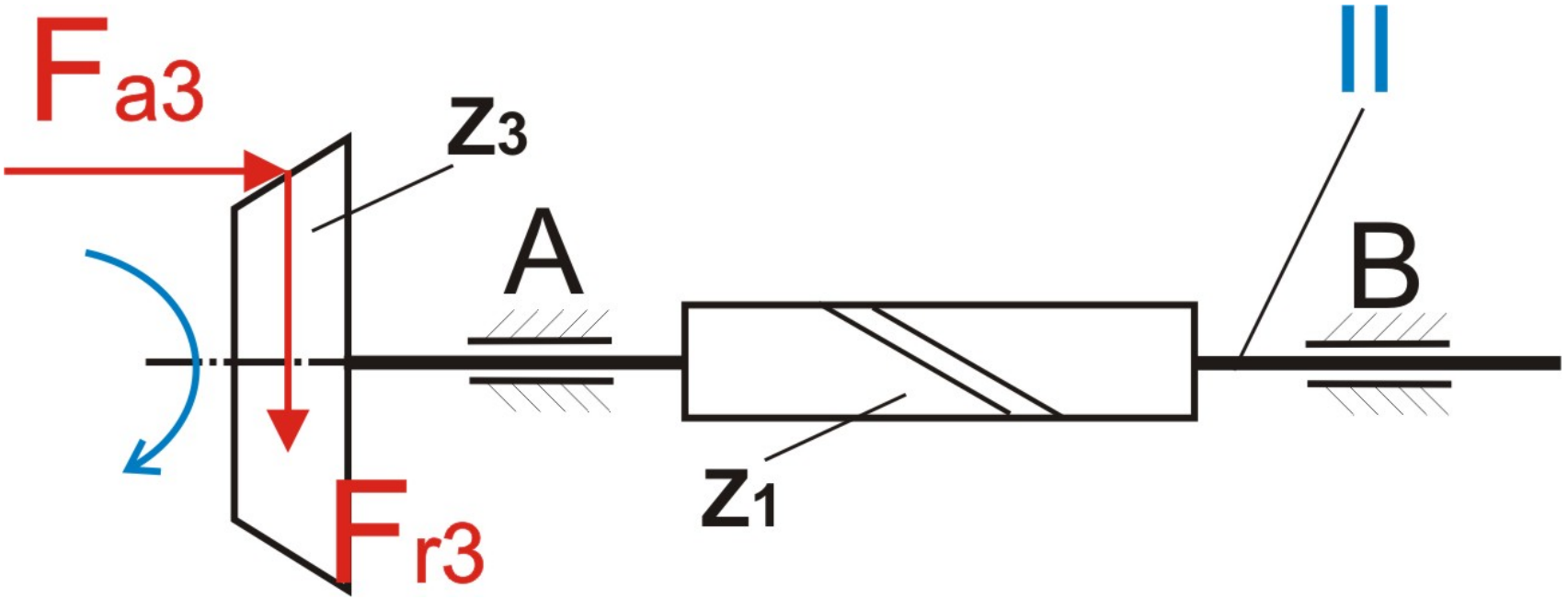
# Šematski prikaz opterećenja vratila II



# Šematski prikaz opterećenja vratila II

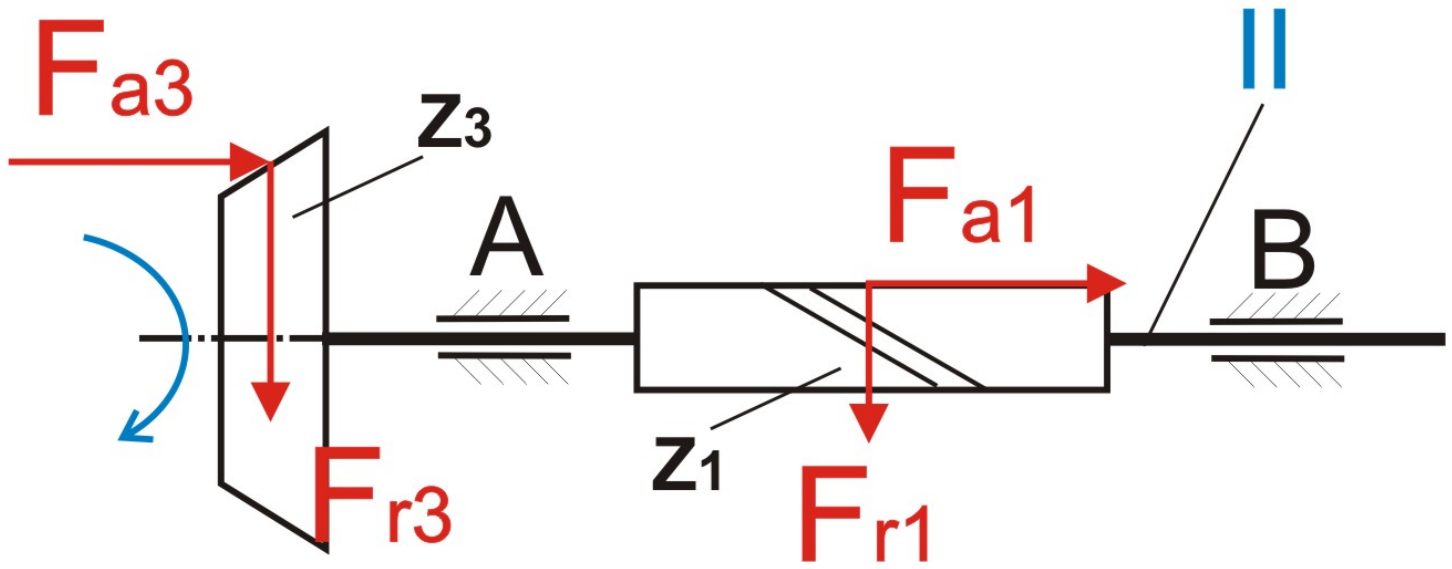


# Šematski prikaz opterećenja vratila II

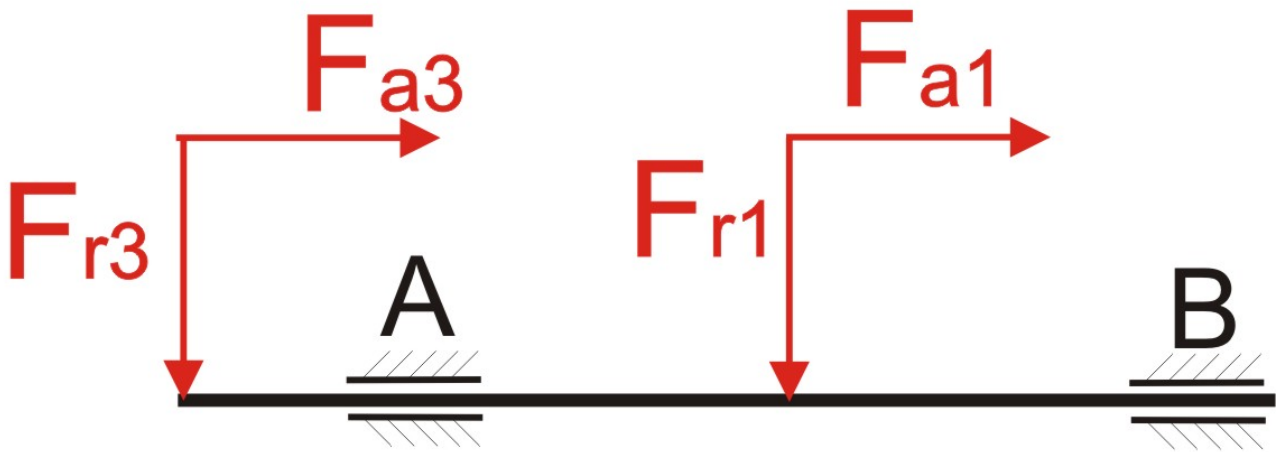


# Šematski prikaz opterećenja vratila II

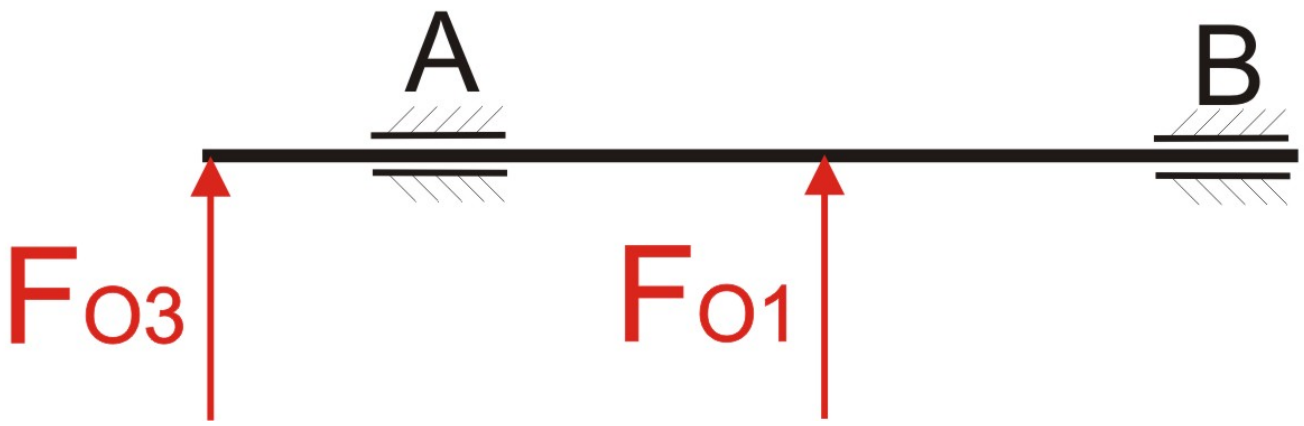
"V"



"V"

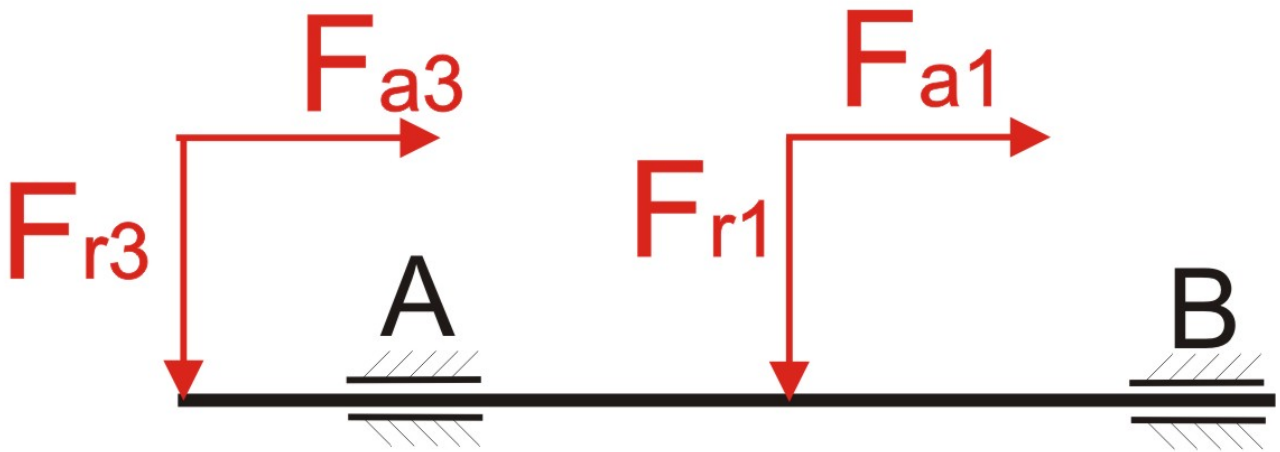



"H"

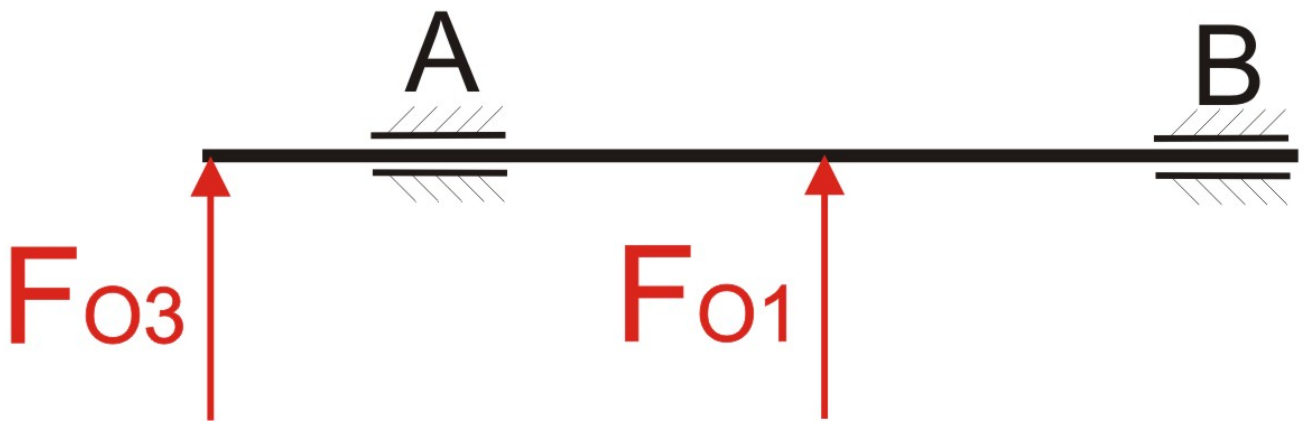


# 3. Dimenzionisanje vratila

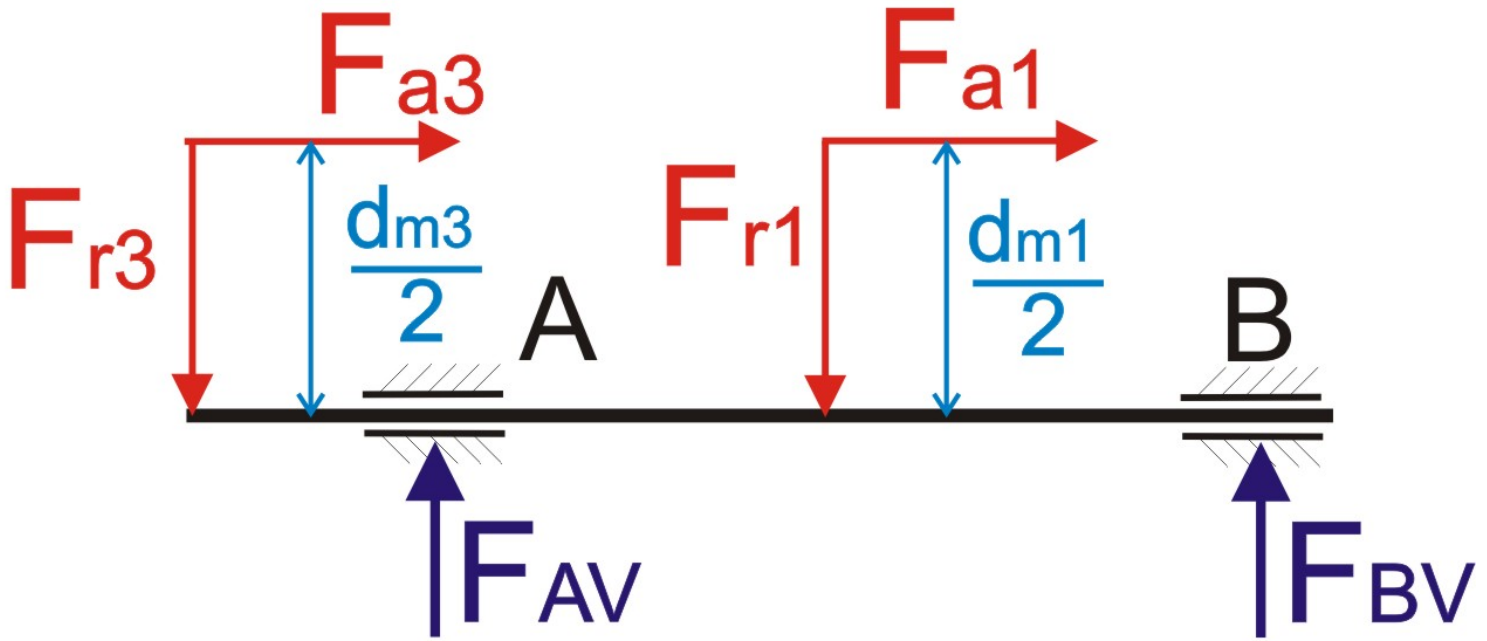
"V"



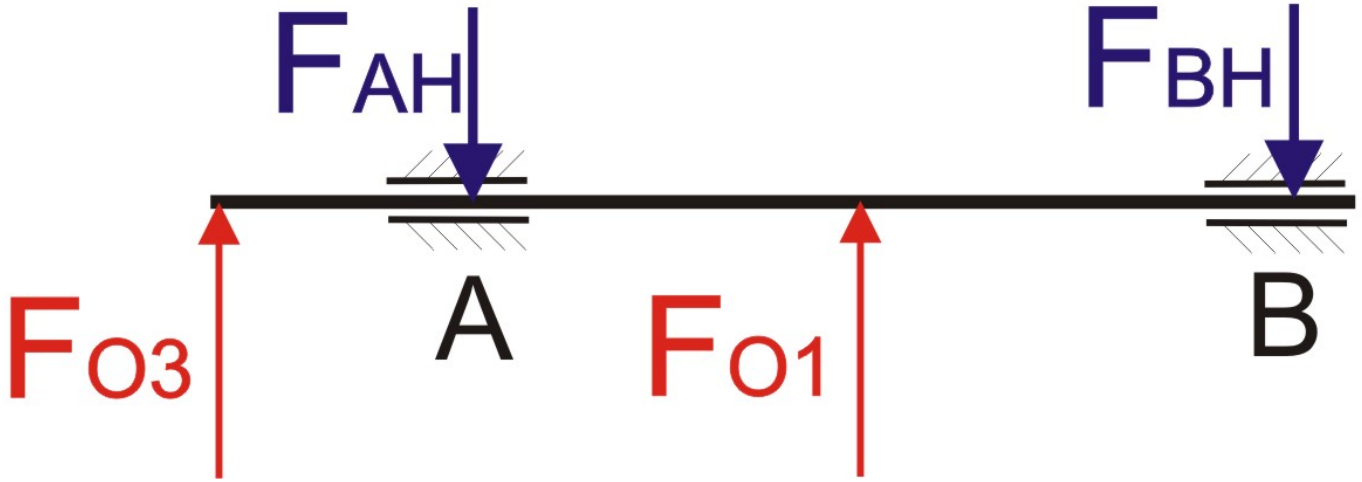

"H"

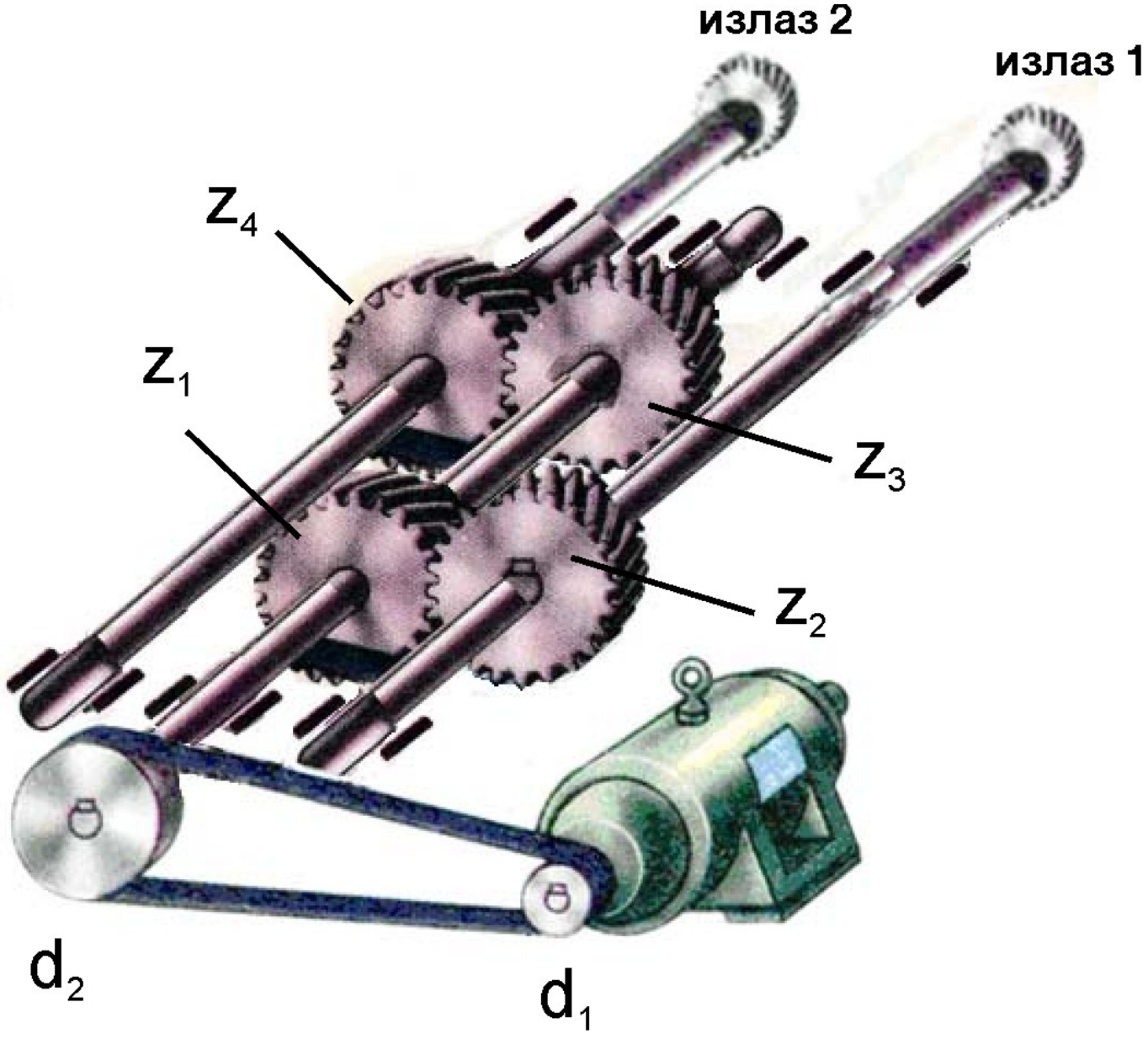


"V"

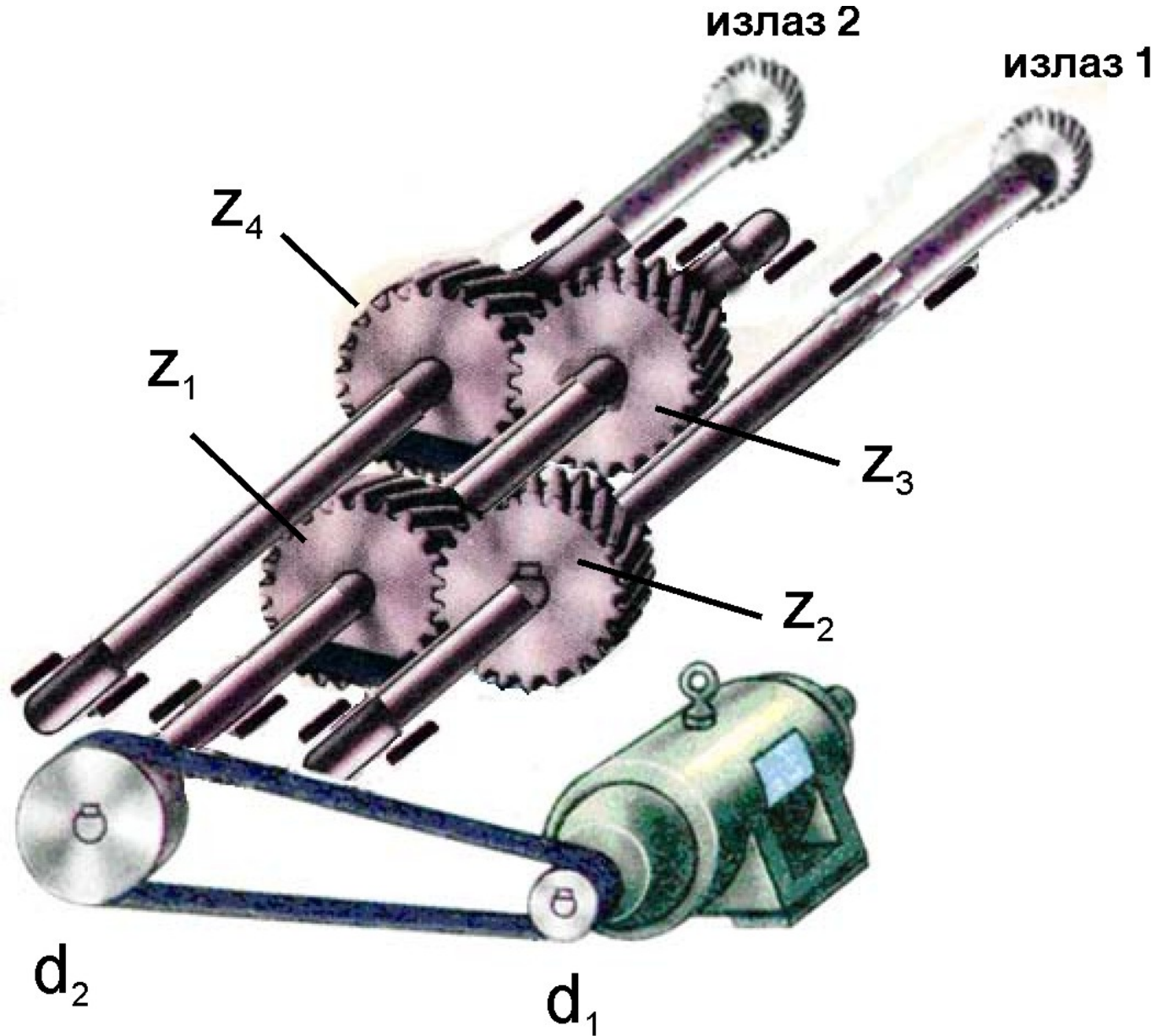



"H"



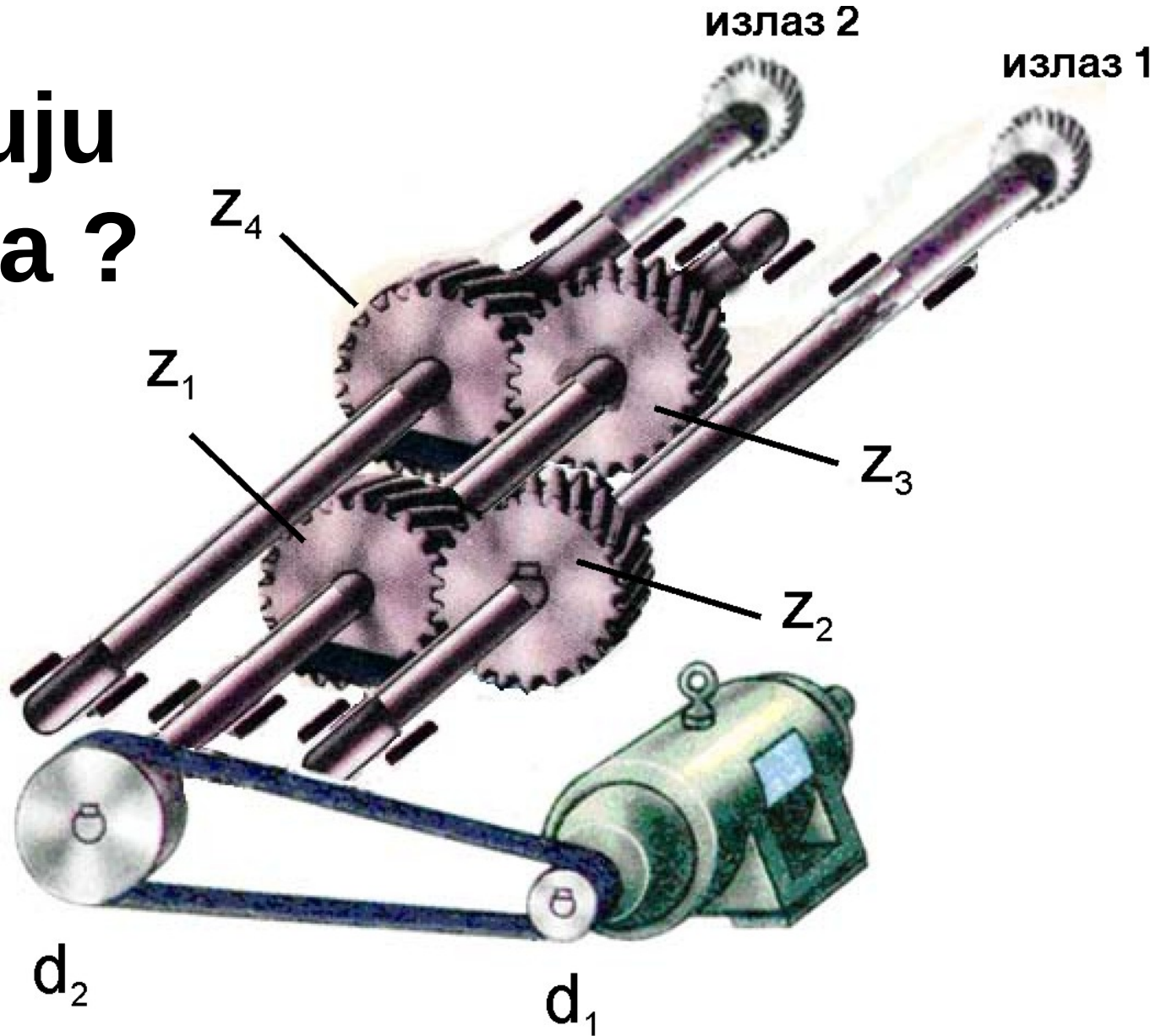

излаз 2
излаз 1
$z_4$
$z_1$
$z_3$
$z_2$
$d_2$
$d_1$

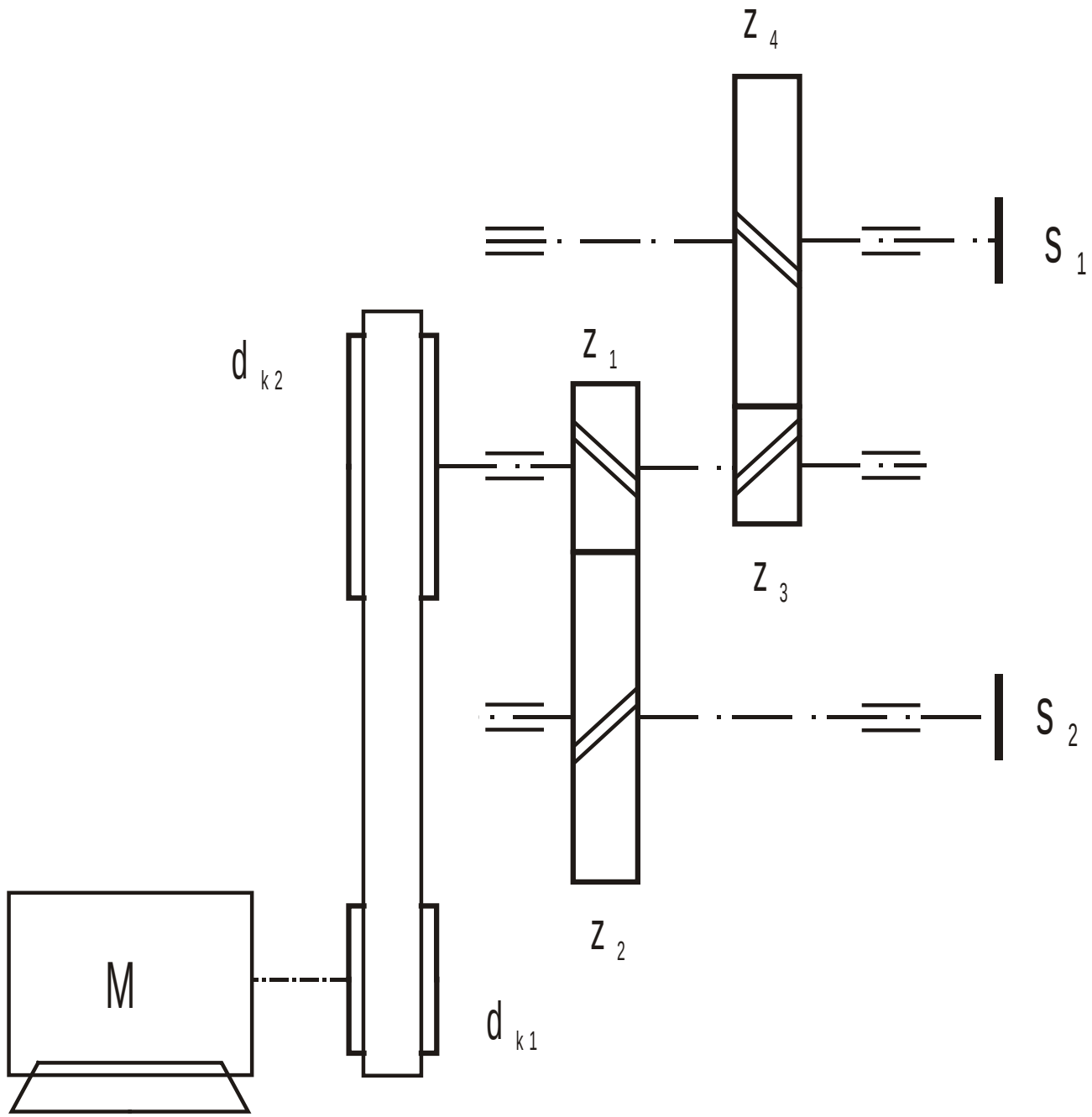
# Prenosnik je u “H”

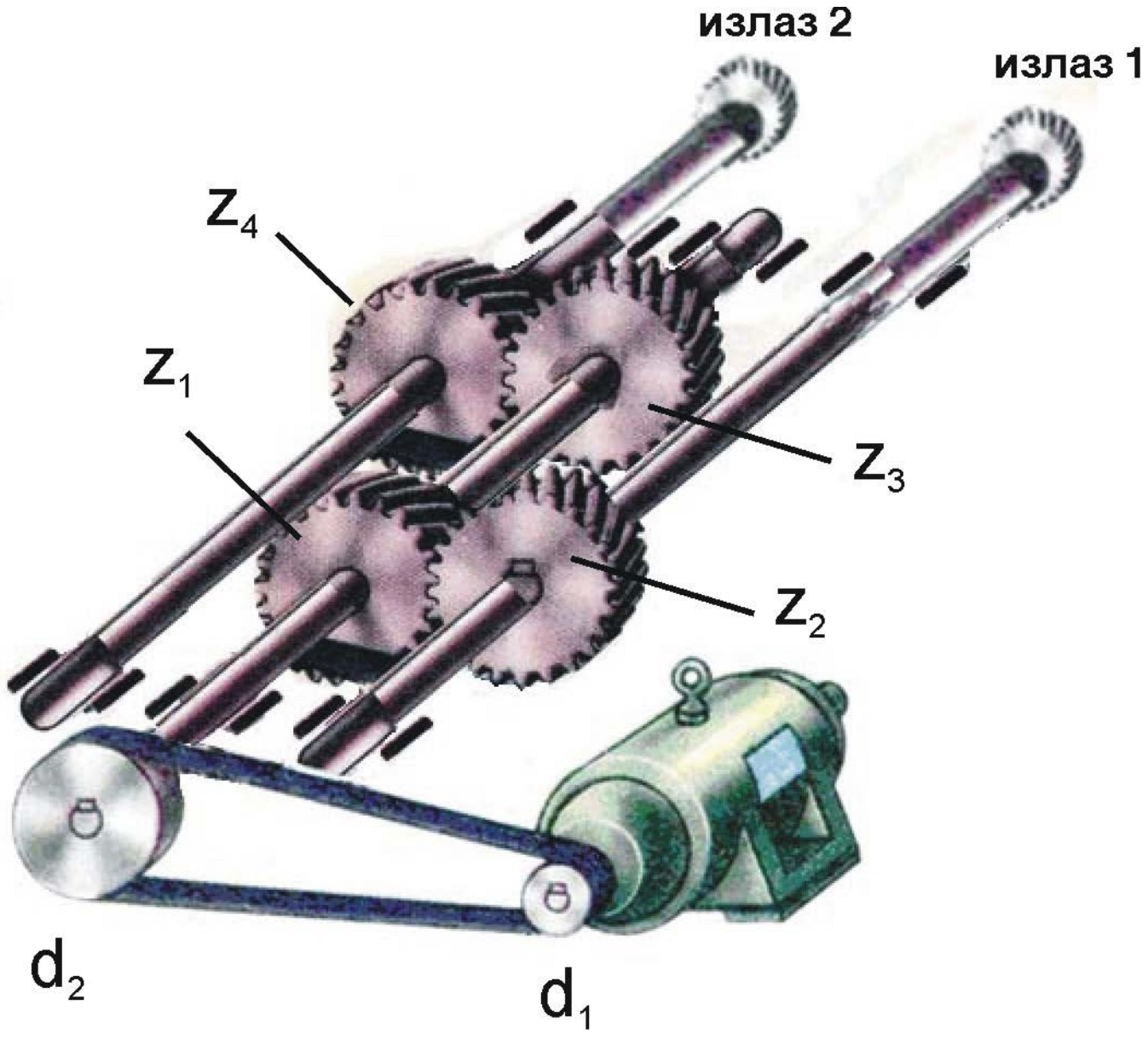


# Prenosnik je u “H”

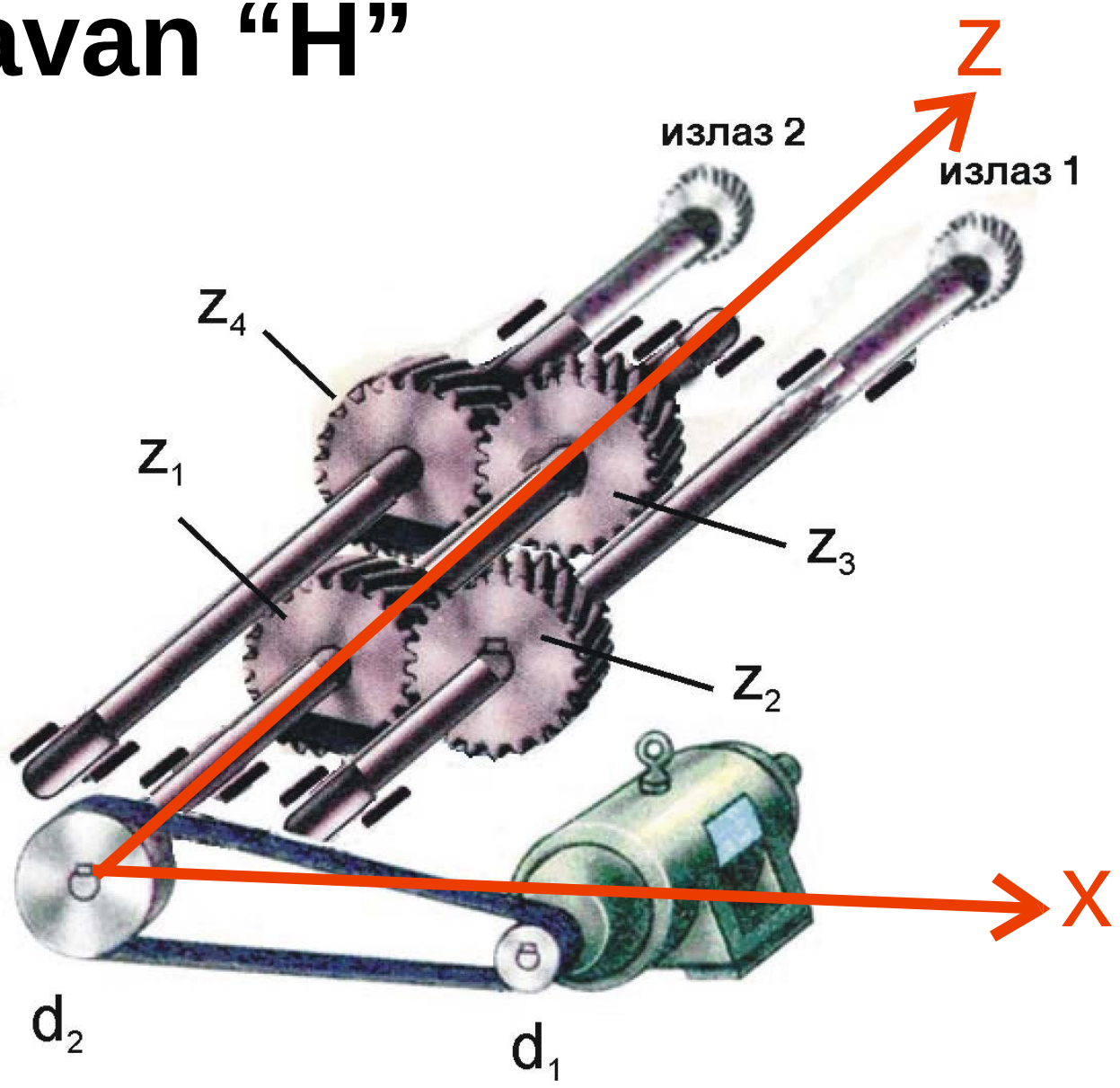
## Gde deluju Fr, Fo i Fa ?

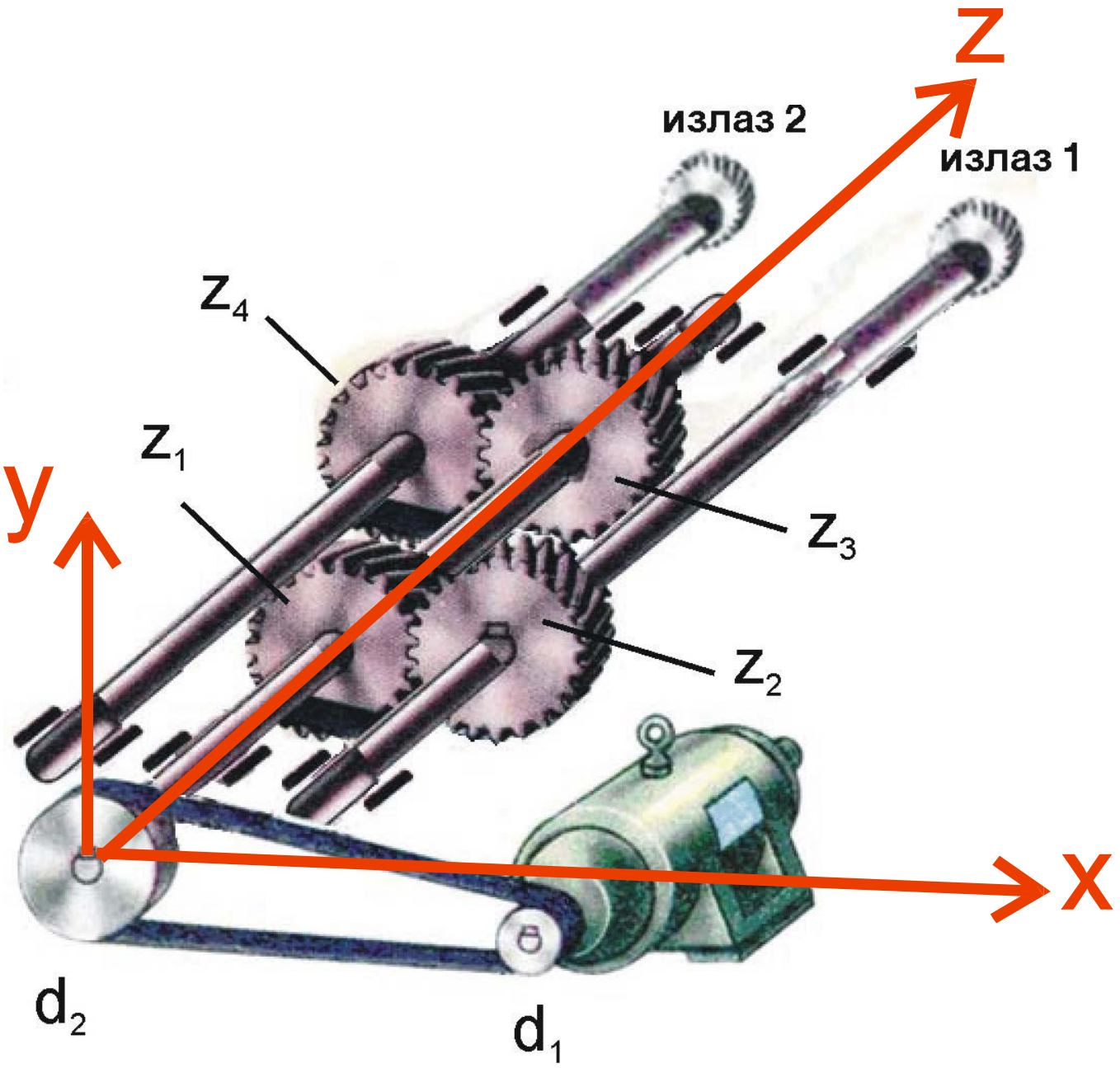


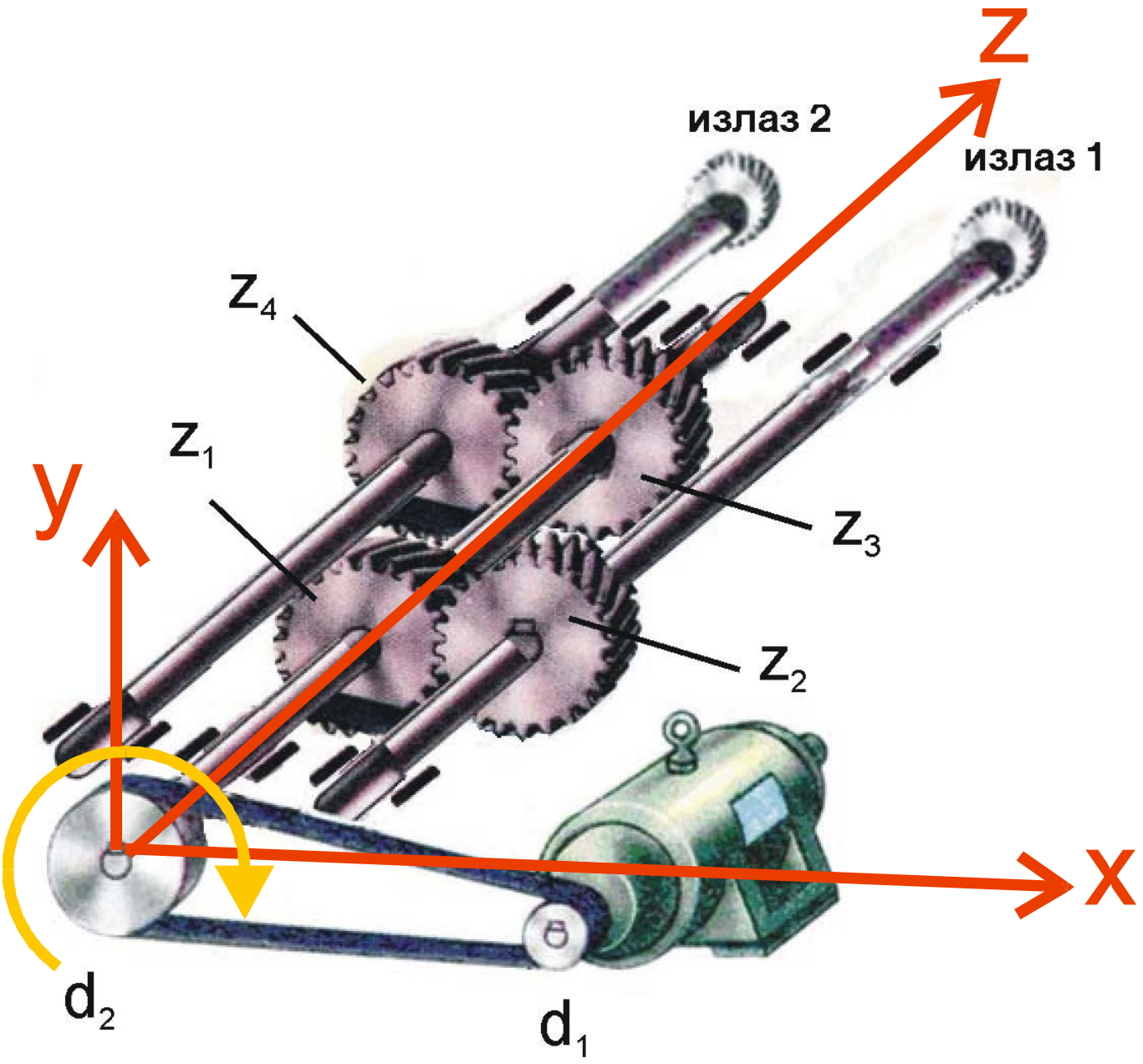

z 4
S 1
d k 2
z 1
z 3
S 2
z 2
M
d k 1

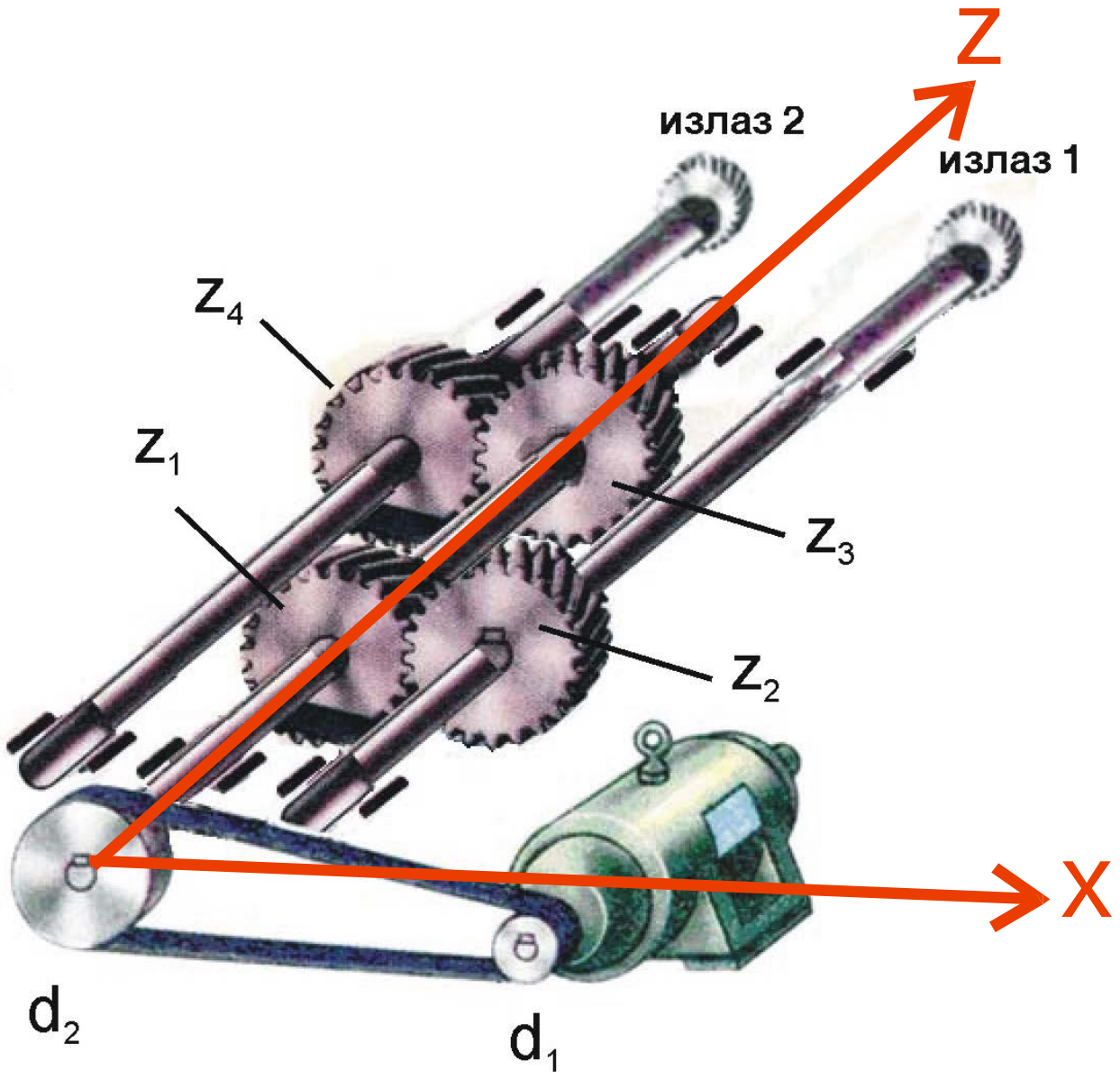

излаз 2
излаз 1
$z_4$
$z_1$
$z_3$
$z_2$
$d_2$
$d_1$

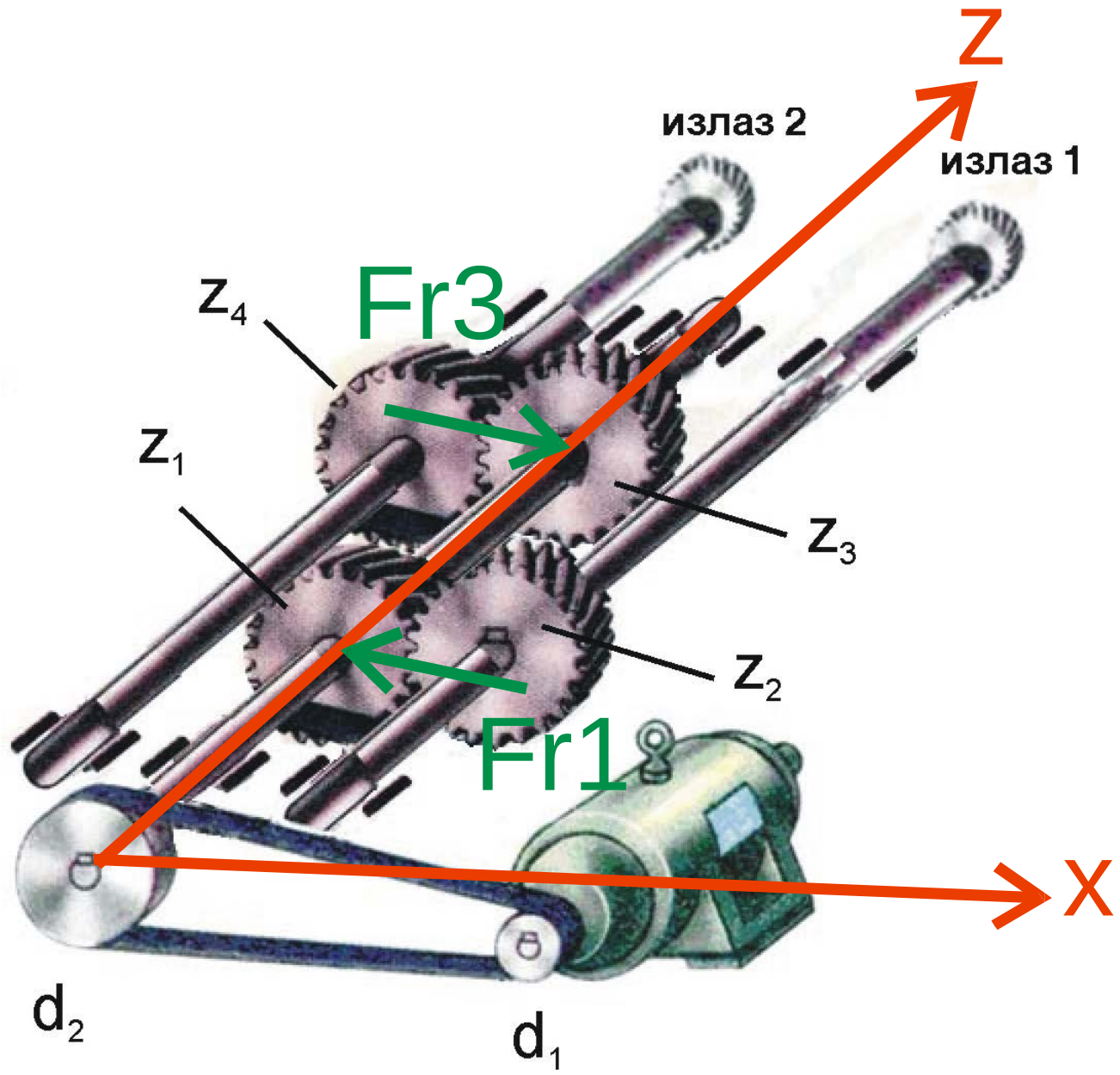
# Ravan “H”

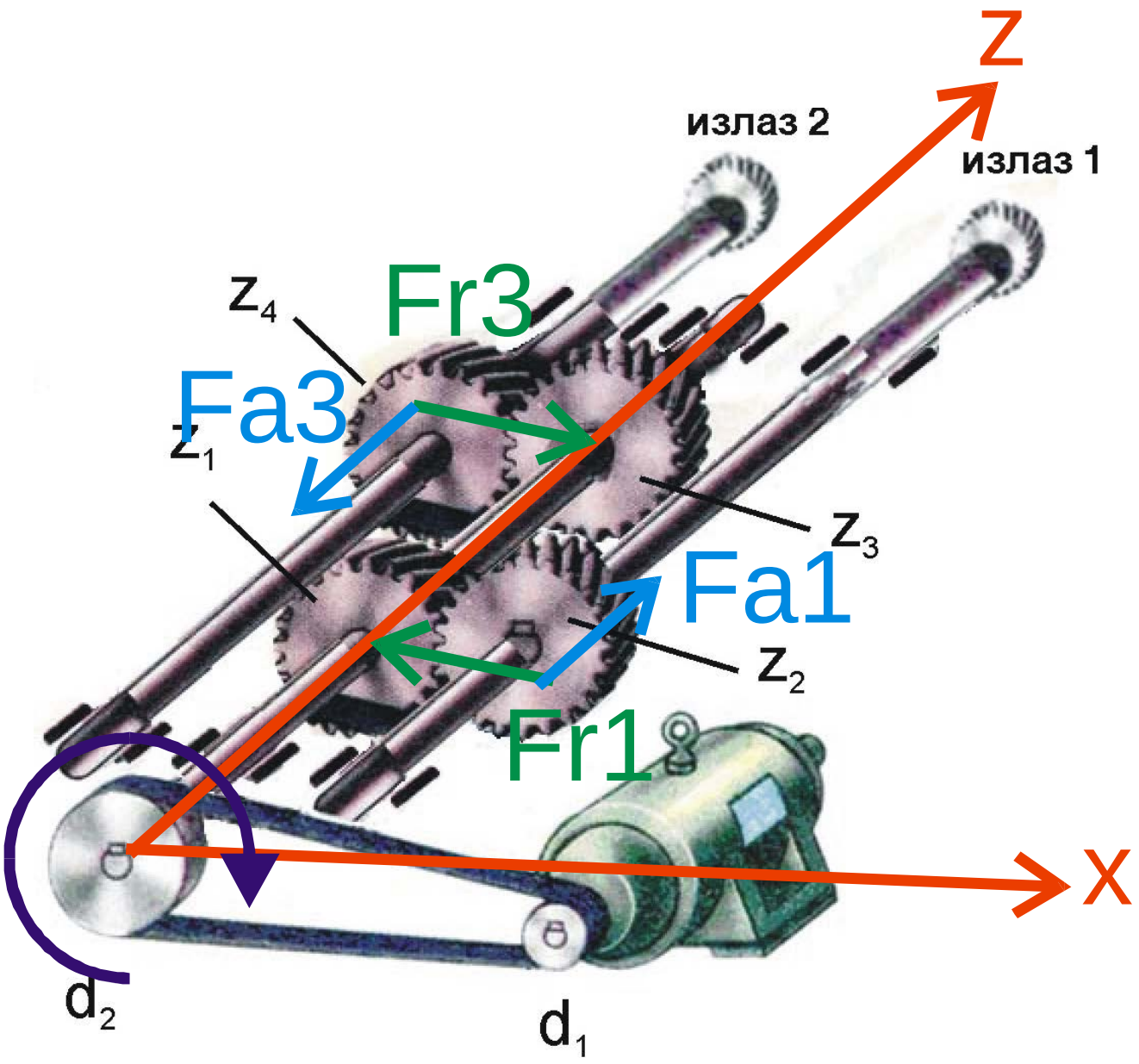


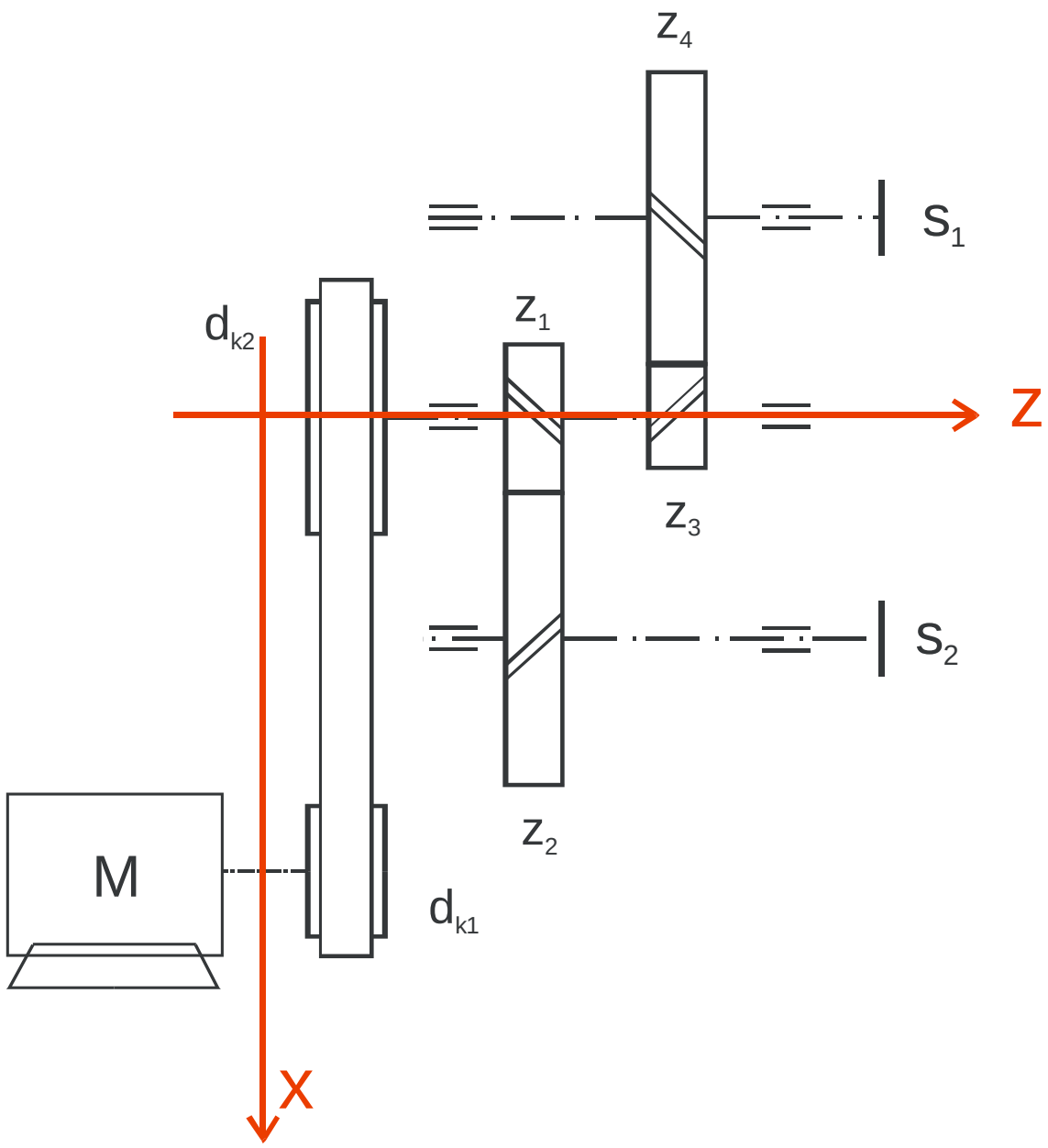

z
излаз 2
излаз 1
$z_4$
$z_1$
$z_3$
$z_2$
y
x
$d_2$
$d_1$

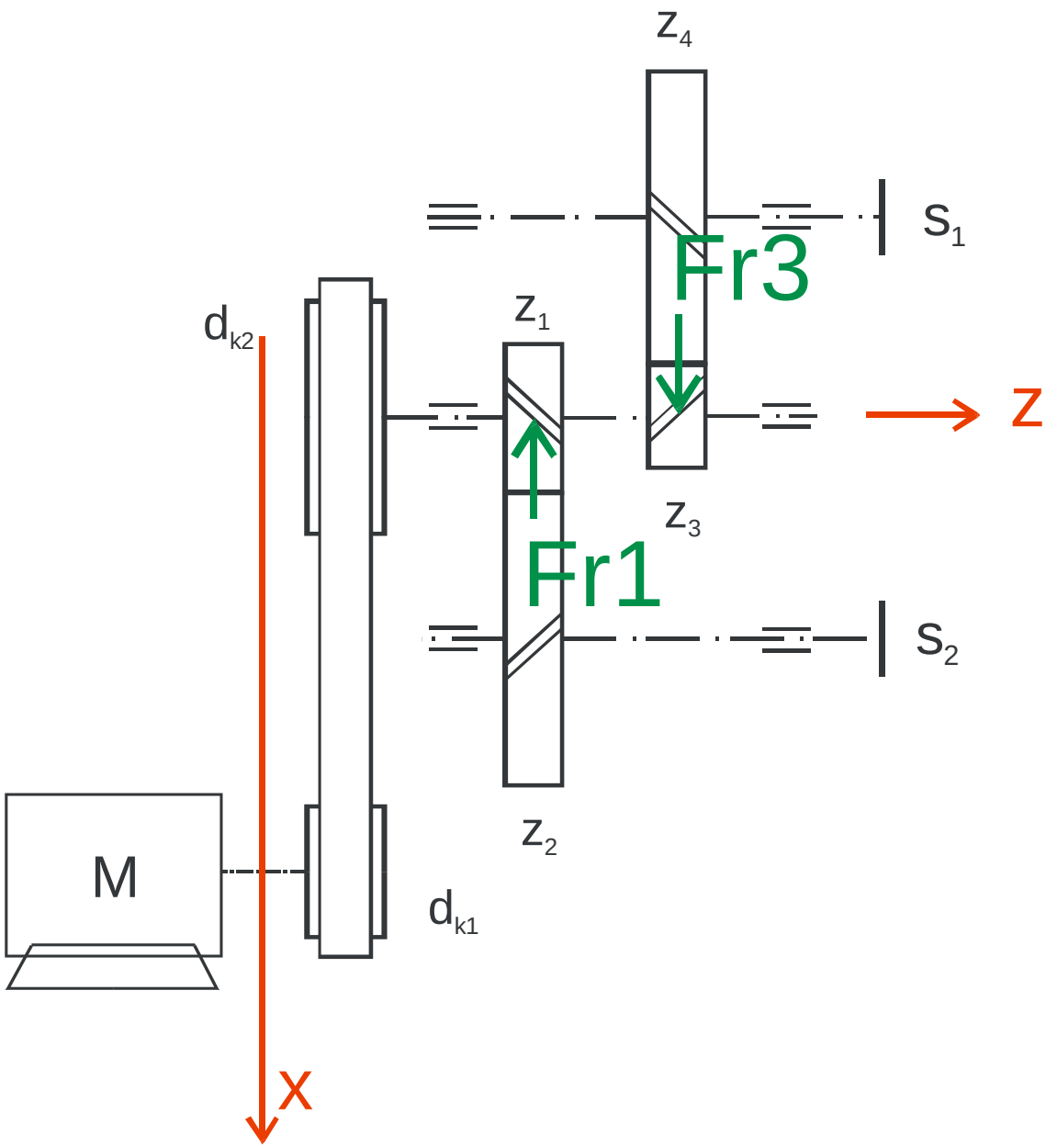

z
излаз 2
излаз 1
$z_4$
$z_1$
$z_3$
$z_2$
y
x
$d_2$
$d_1$

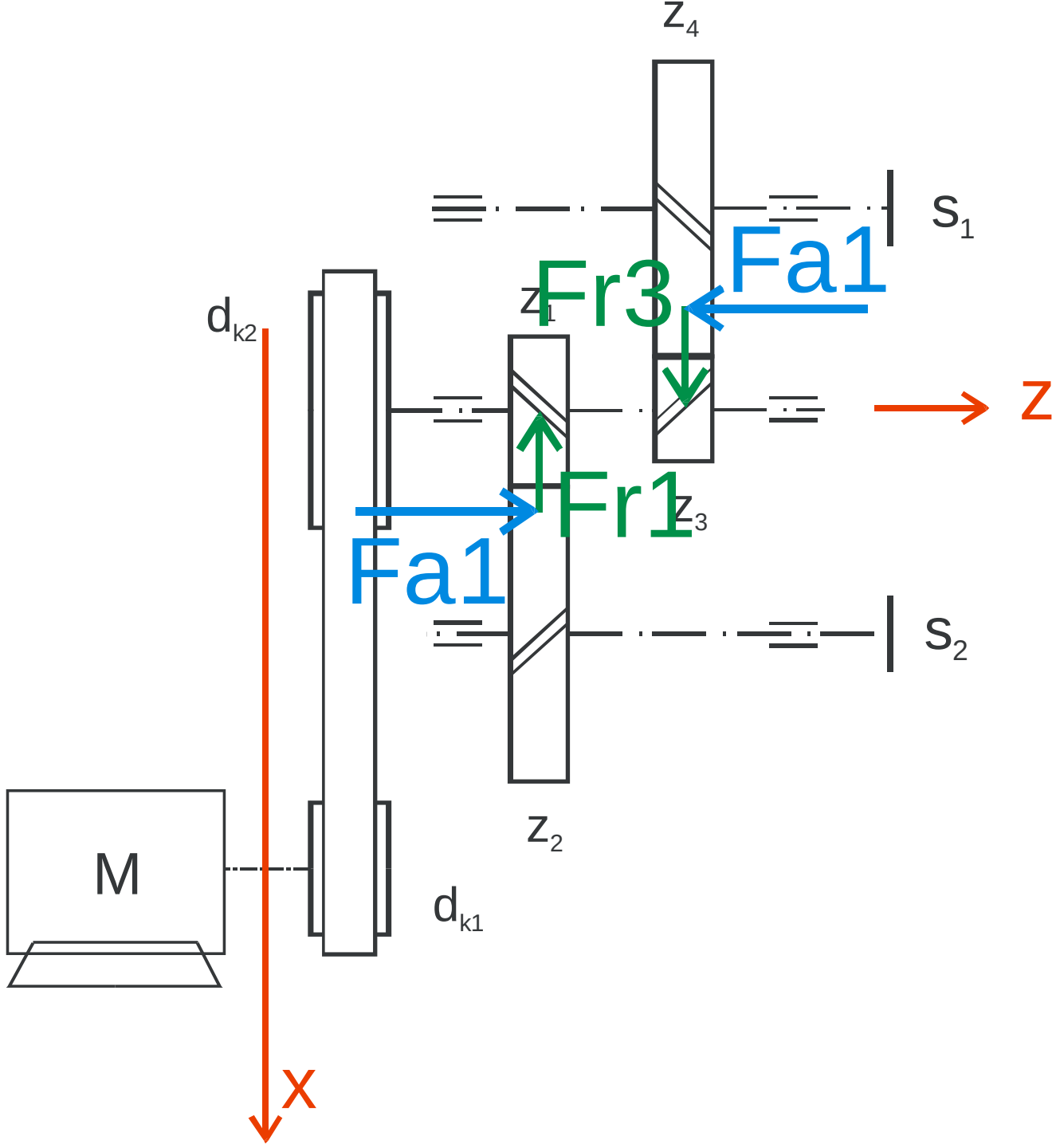

Z
излаз 2
излаз 1
$z_4$
$z_1$
$z_3$
$z_2$
X
$d_2$
$d_1$

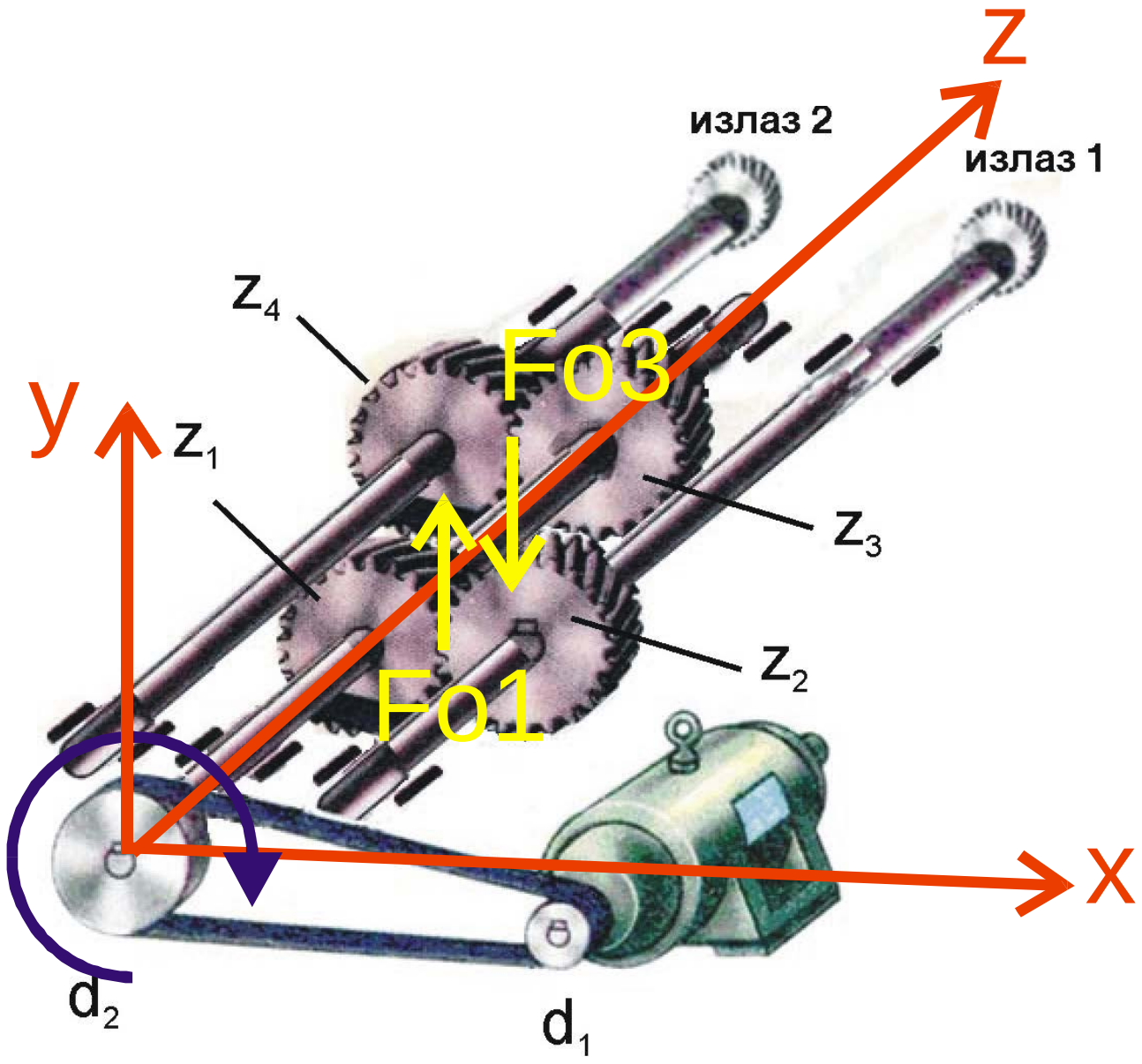

Z
излаз 2
излаз 1
Fr3
z4
z1
z3
z2
Fr1
X
d2
d1


Z
излаз 2
излаз 1
Fr3
Fa3
$z_4$
$z_1$
$z_3$
Fa1
$z_2$
Fr1
X
$d_2$
$d_1$


z4
s1
dk2
z1
Z
z3
s2
z2
M
dk1
X


z4
s1
Fr3
dk2
z1
z
z3
Fr1
s2
M
z2
dk1
X


z4
s1
Fa1
Fr3
z1
dk2
z
Fr1
z3
Fa1
s2
M
z2
dk1
x


z
излаз 2
излаз 1
$z_4$
Fo3
y
$z_1$
$z_3$
$z_2$
Fo1
x
$d_2$
$d_1$