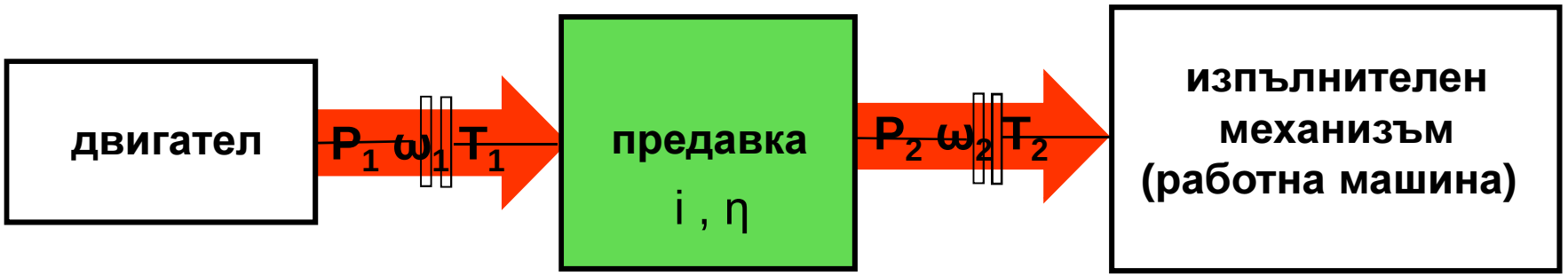
Въпрос № 7

МЕХАНИЧНИ ПРЕДАВКИ – ОБЩИ ХАРАКТЕРИСТИКИ И К.П.Д. ЗЪБНИ ПРЕДАВКИ – КЛАСИФИКАЦИИ. ГЕОМЕТРИЧНИ ЗАВИСИМОСТИ ПРИ ЦИЛИНДРИЧНИ ЗЪБНИ КОЛЕЛА С ПРАВИ ЗЪБИ

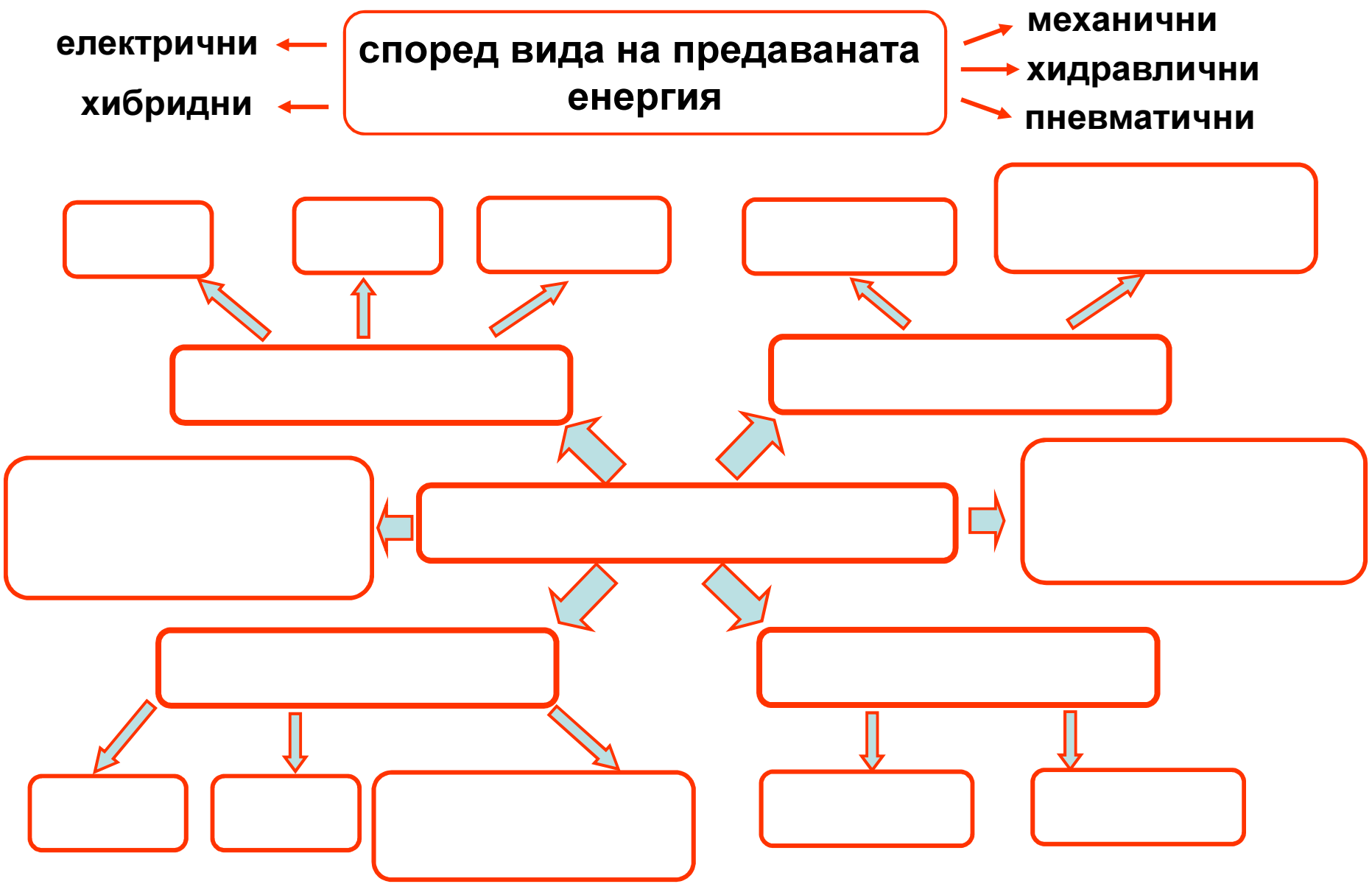
МЕХАНИЧНИ ПРЕДАВКИ



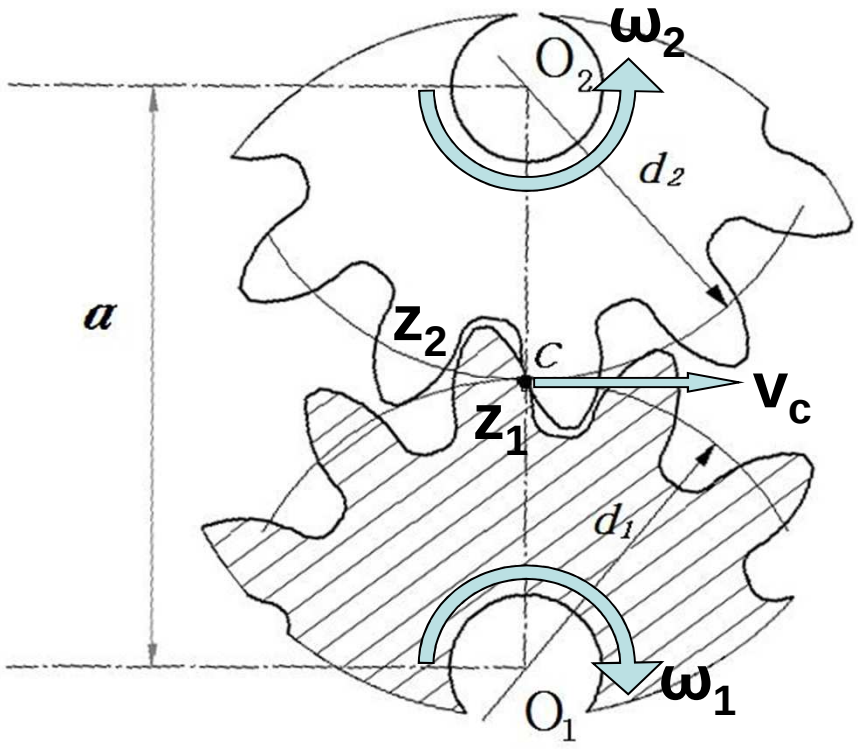
$(i = const)$

$(i \neq const)$

Класификации на предавките



ЗЪБНИ ПРЕДАВКИ



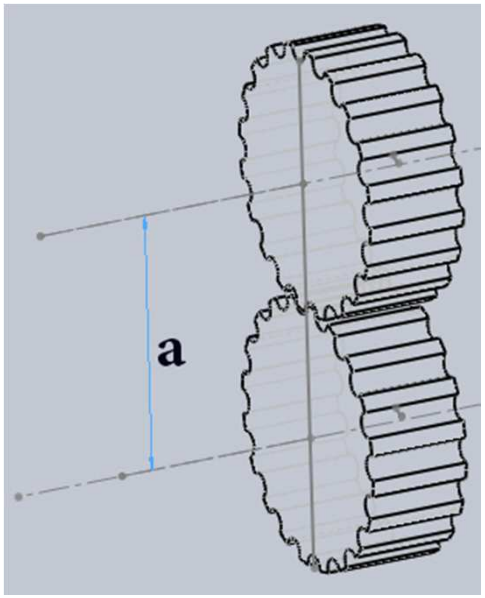
$$v_c = \omega_1 \frac{d_1}{2} = \omega_2 \frac{d_2}{2}$$

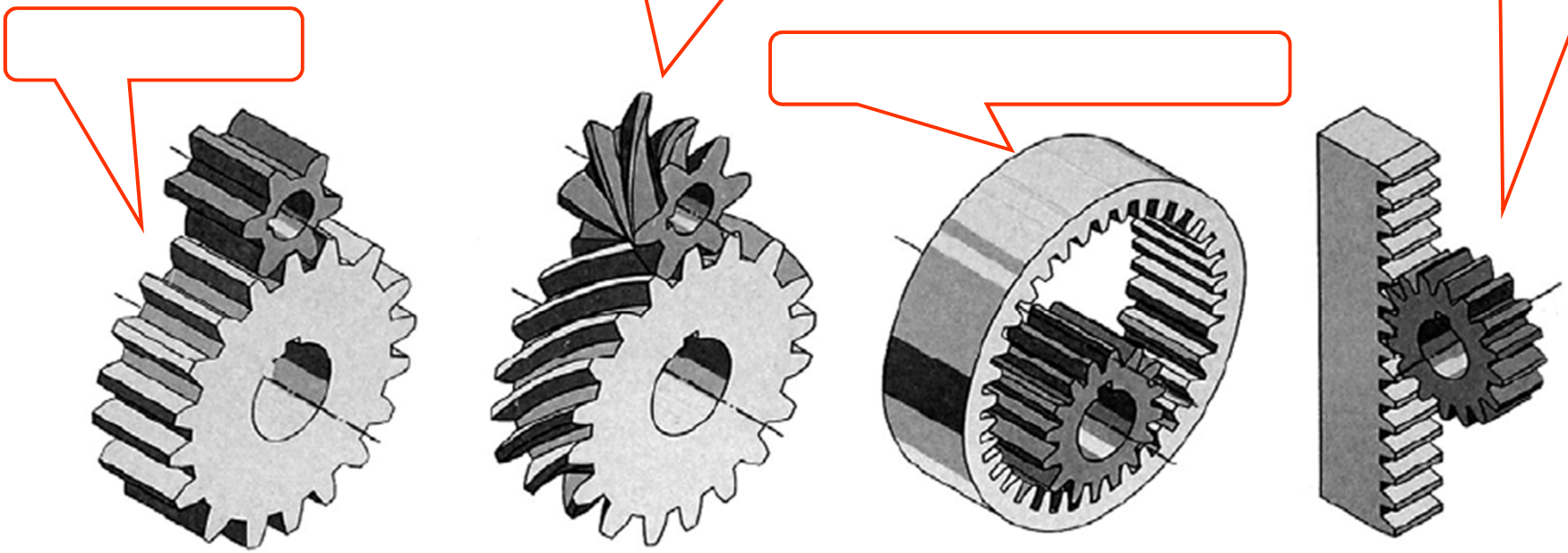
предавателно отношение

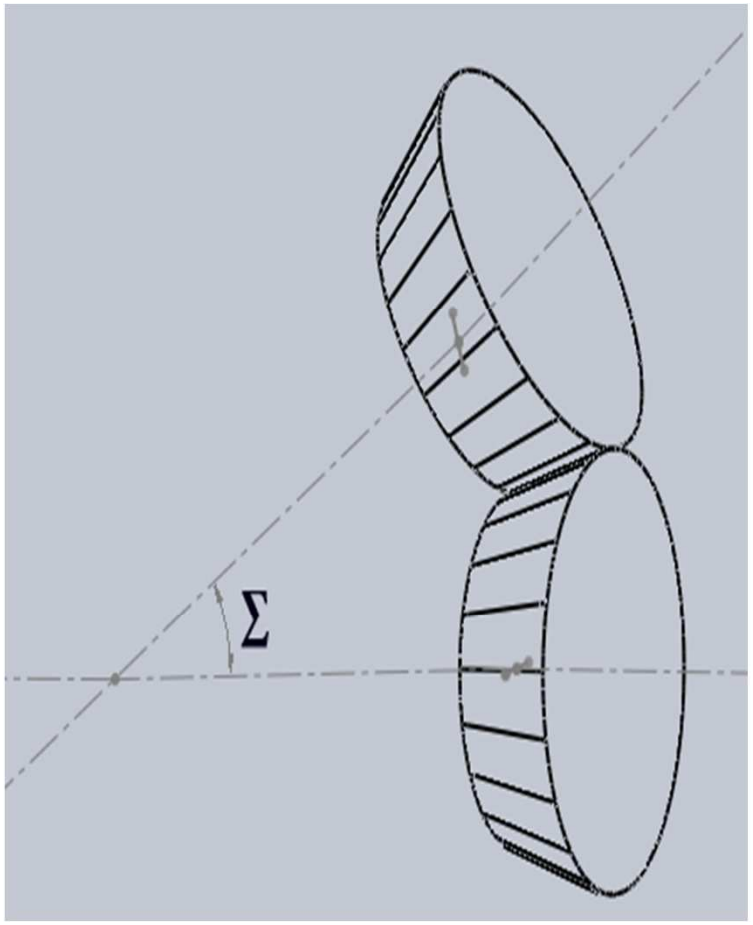
предавателно число

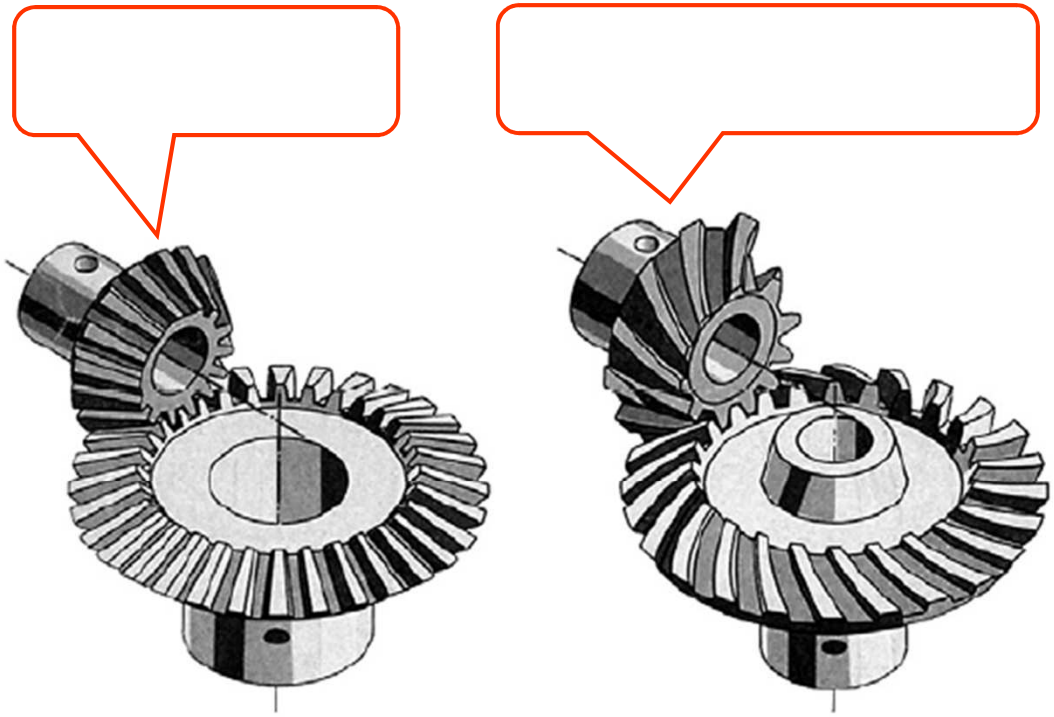
Класификации на зъбните предавки

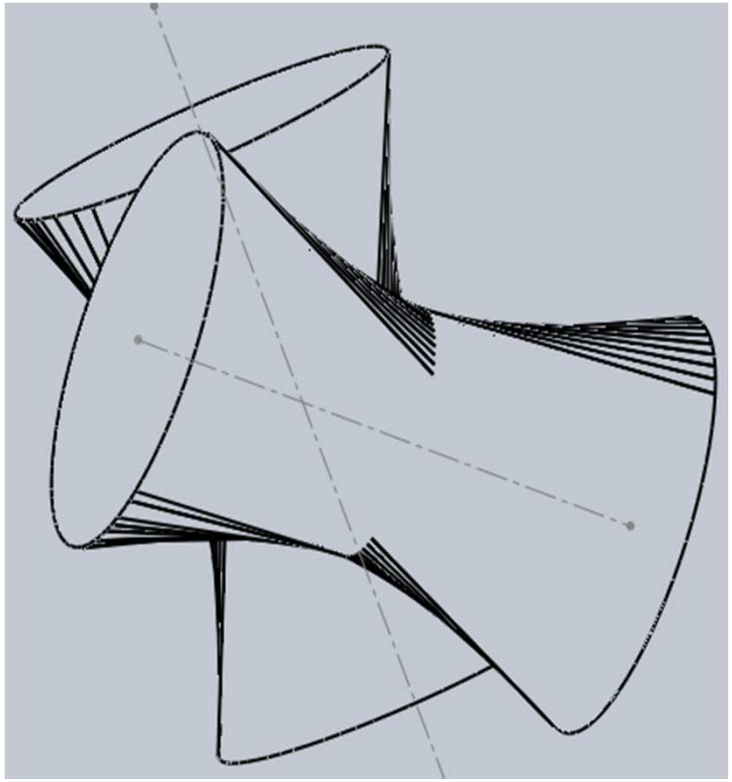
1. Според взаимното разположение на осите на зъбните колела

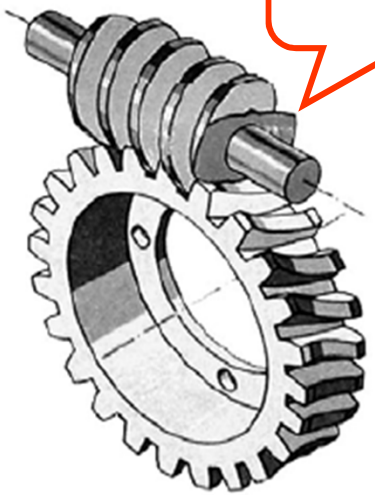


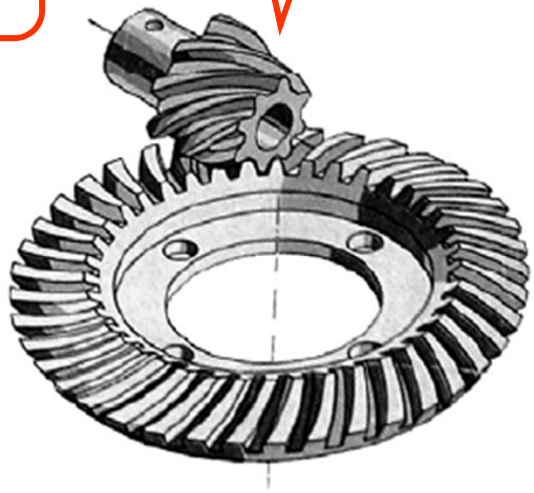


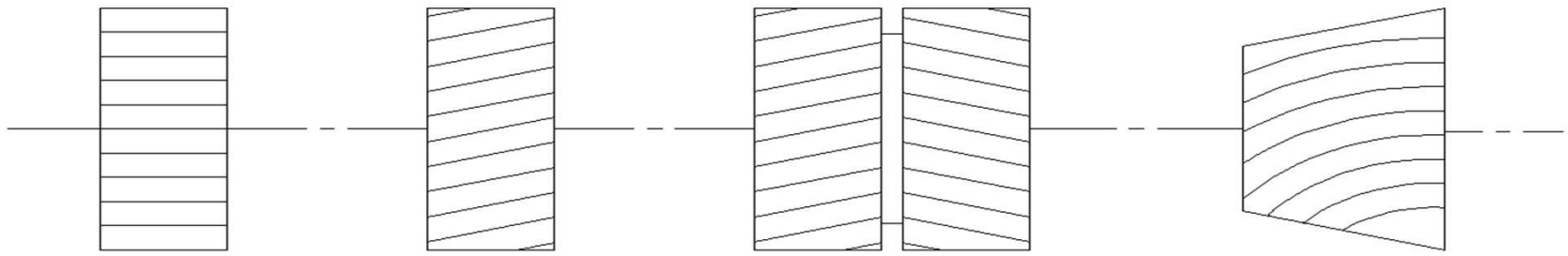

Σ











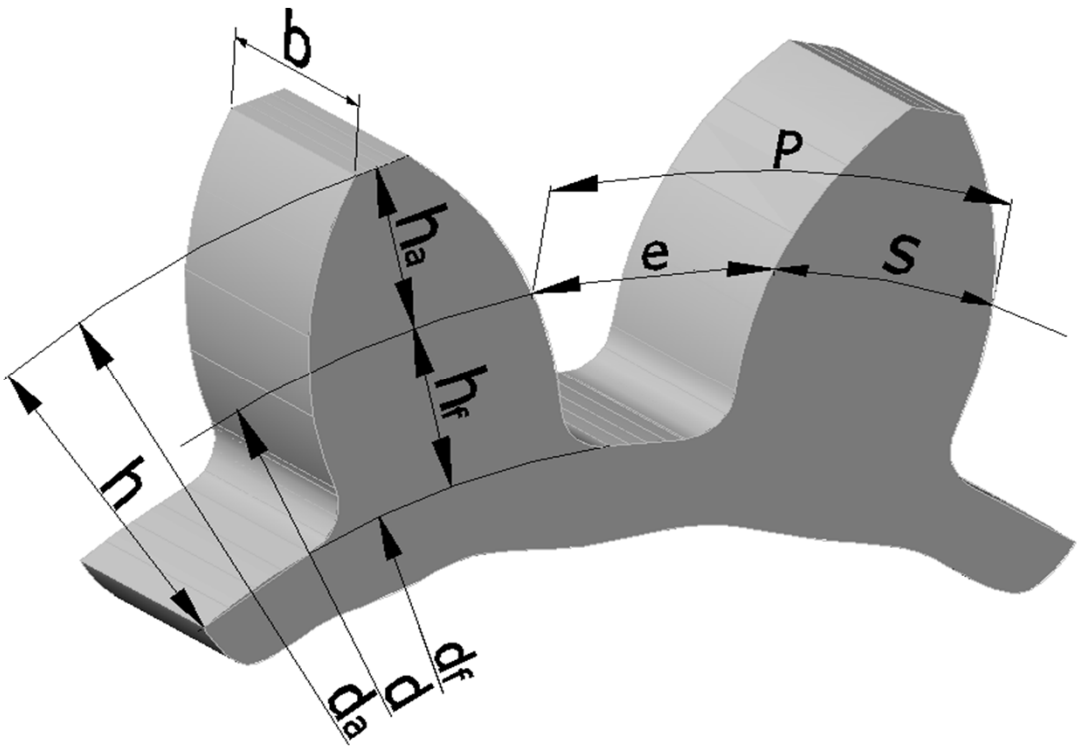
Прави зъби

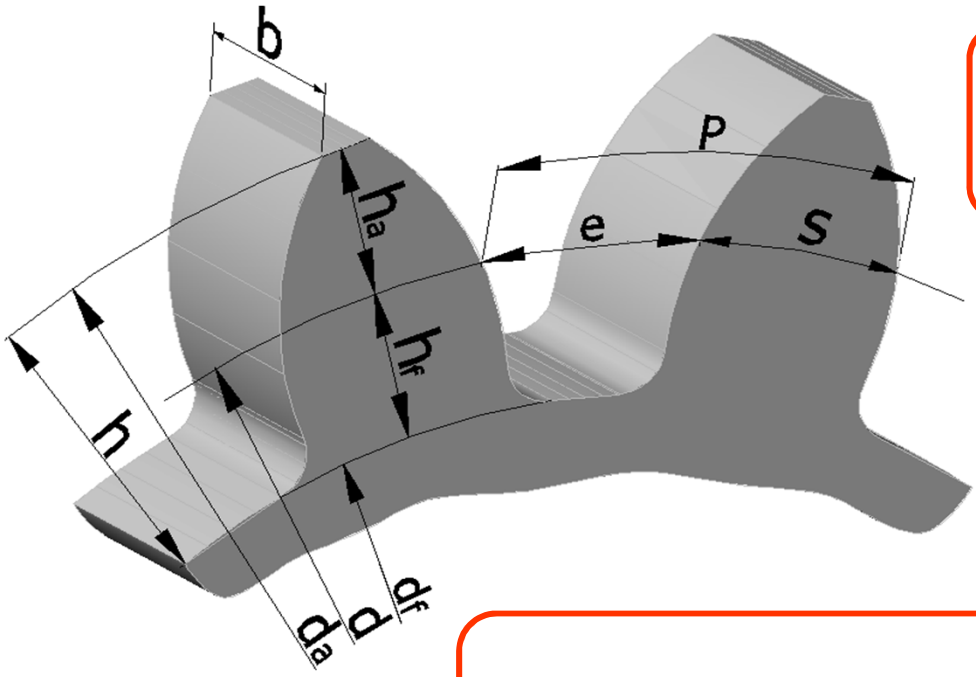
Наклонени зъби

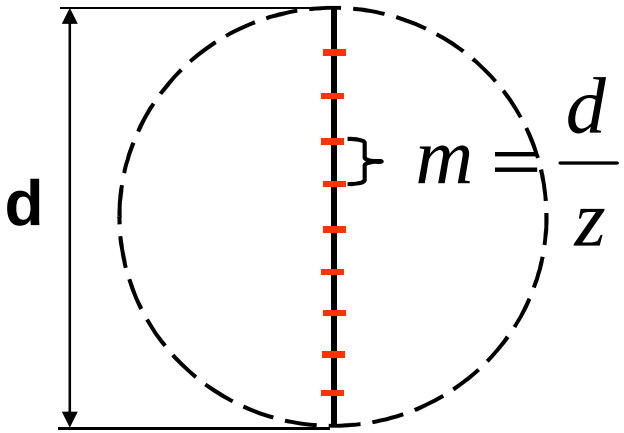
Шевронни зъби

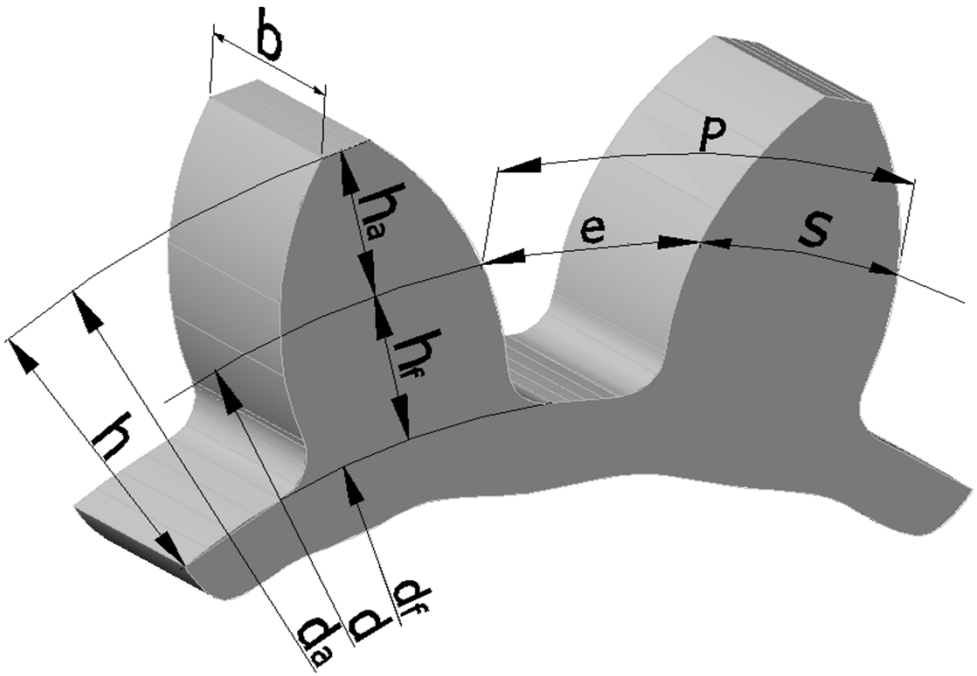
Криволинейни зъби

ГЕОМЕТРИЧНИ ЗАВИСИМОСТИ ПРИ ЗЪБНИ КОЛЕЛА С ПРАВИ ЗЪБИ !!!




b
P
e
S
h_a
h_f
h
d_a
d
d_f

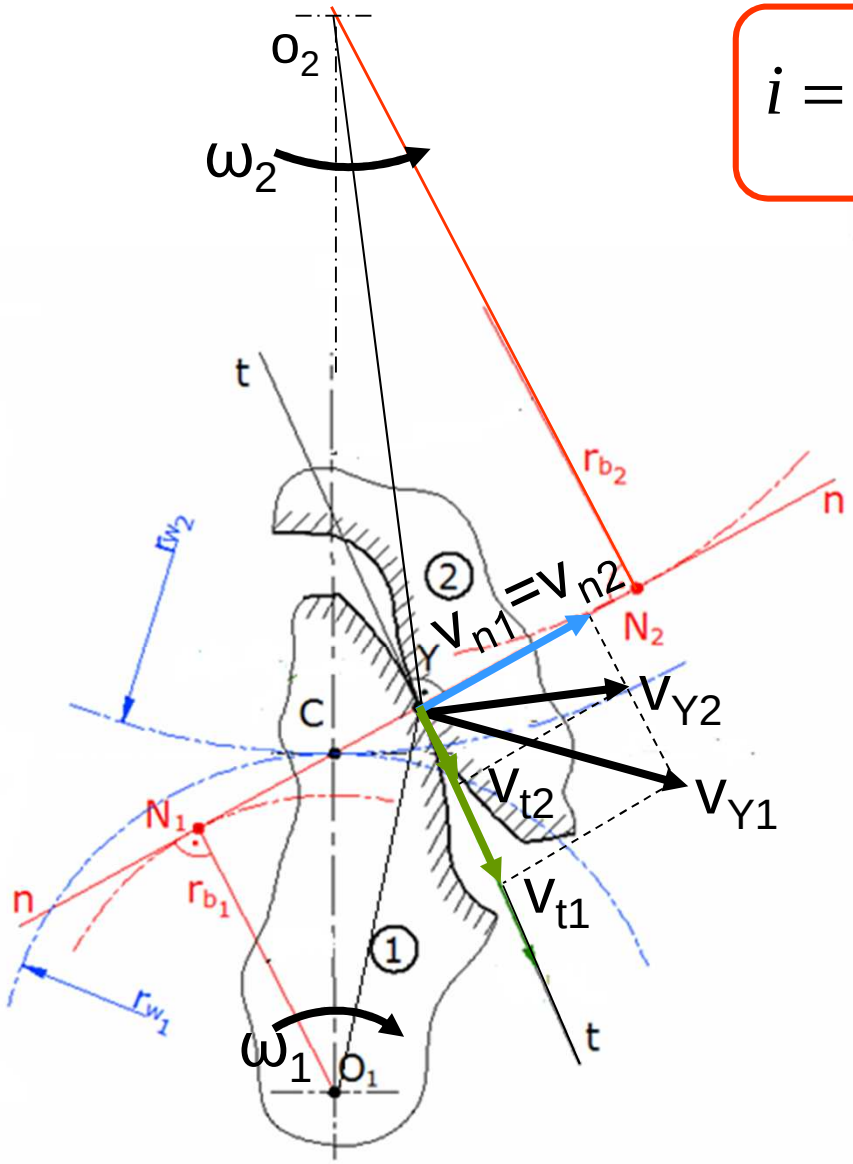

d
$m = \frac{d}{z}$


b
P
e
s
h_a
h_f
h
d_a
d
d_f

Въпрос № 8

ЗЪБНИ ПРЕДАВКИ – ОСНОВЕН ЗАКОН НА ЗАЦЕПВАНЕ

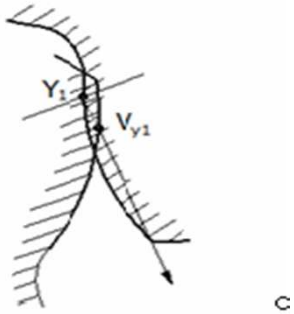
ОСНОВЕН ЗАКОН НА ЗЪБНОТО ЗАЦЕПВАНЕ



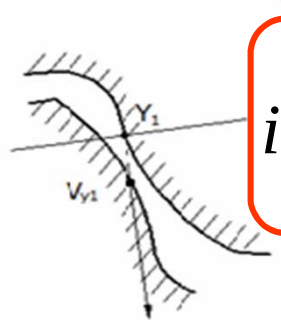
$$i = \frac{\omega_1}{\omega_2} = const$$

$$\begin{cases} v_{Y1} = \omega_1 \overline{O_1 Y} \\ v_{Y2} = \omega_2 \overline{O_2 Y} \end{cases}$$

$$v_{n1} = v_{n1}\ !$$



$$\begin{cases} v_{n1} = \omega_1 \overline{O_1 N_1} \\ v_{n2} = \omega_2 \overline{O_2 N_2} \end{cases}$$



$$i = \frac{\omega_1}{\omega_2} = \frac{\overline{O_2 N_2}}{\overline{O_1 N_1}} = const$$

$$\Delta O_1 N_1 C \sim \Delta O_2 N_2 C$$

$$\frac{\overline{O_2 N_2}}{\overline{O_1 N_1}} = \frac{\overline{O_2 C}}{\overline{O_1 C}} = i = const$$

$$\overline{O_1 C} + \overline{O_2 C} = \overline{O_1 O_2} = const$$

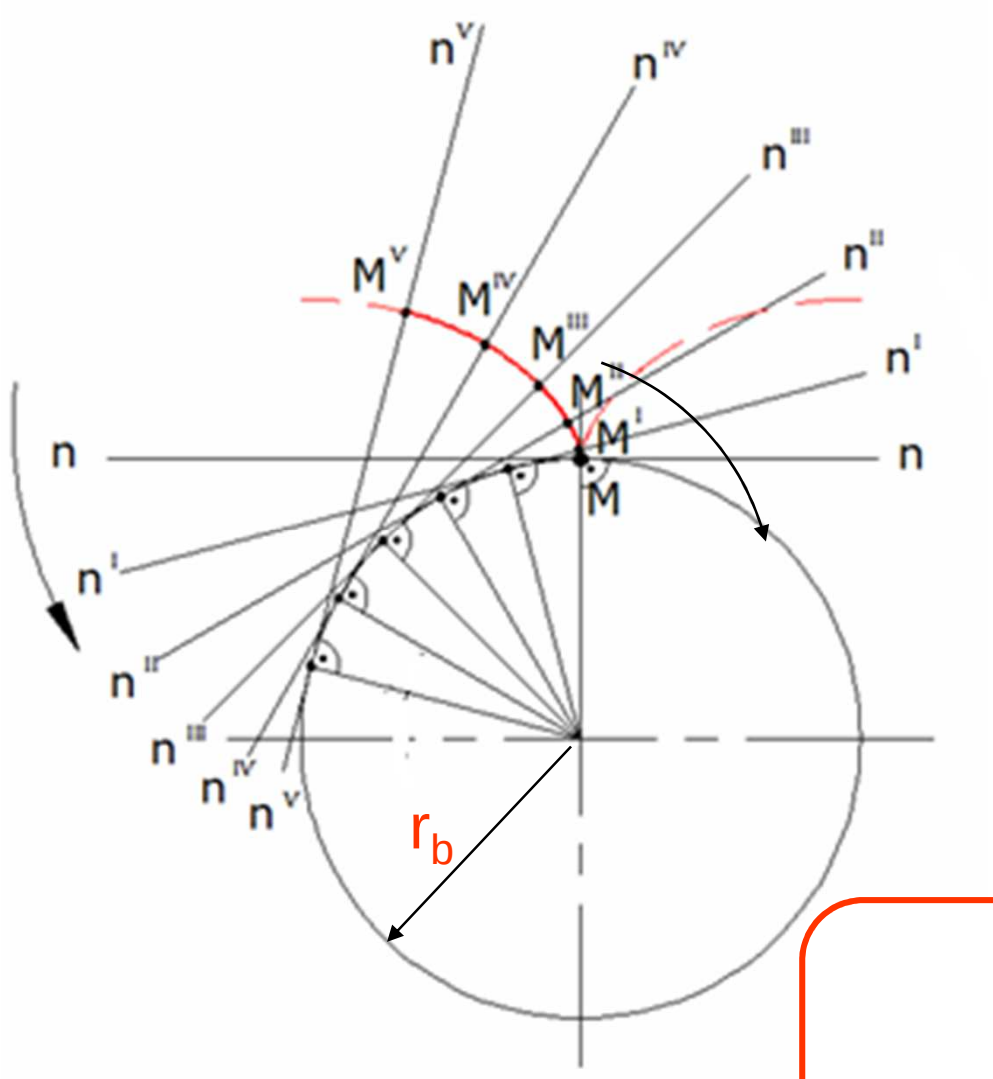
Полюсът С дели междуосевото разстояние O_1O_2 на отсечки с дължини обратно пропорционални на ъгловите скорости.

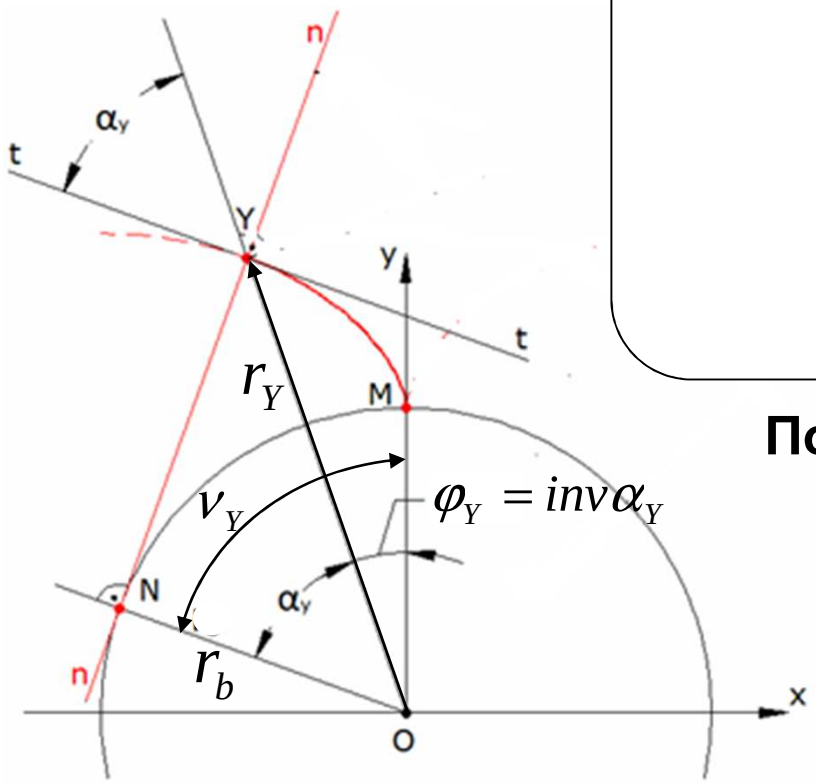
$$v_c = \omega_1 \overline{O_1C} = \omega_2 \overline{O_2C} \Rightarrow i = \frac{\omega_1}{\omega_2} = \frac{\overline{O_2C}}{\overline{O_1C}} = const$$

В полюса на зацепване (т.С) $v_s = 0$

Въпрос № 9

ЕВОЛВЕНТНО ЗАЦЕПВАНЕ – СВОЙСТВА. ПРОФИЛЕН ЪГЪЛ И ЪГЪЛ НА ЗАЦЕПВАНЕ. КОЕФИЦИЕНТ НА ПРИПОКРИВАНЕ.


n^V
n^IV
n^III
n^II
n^I
n
M^V
M^IV
M^III
M^II
M^I
M
n
n^I
n^II
n^III
n^IV
n^V
r_b



Положението на т.Y се определя от полярните координати r_Y и φ_Y

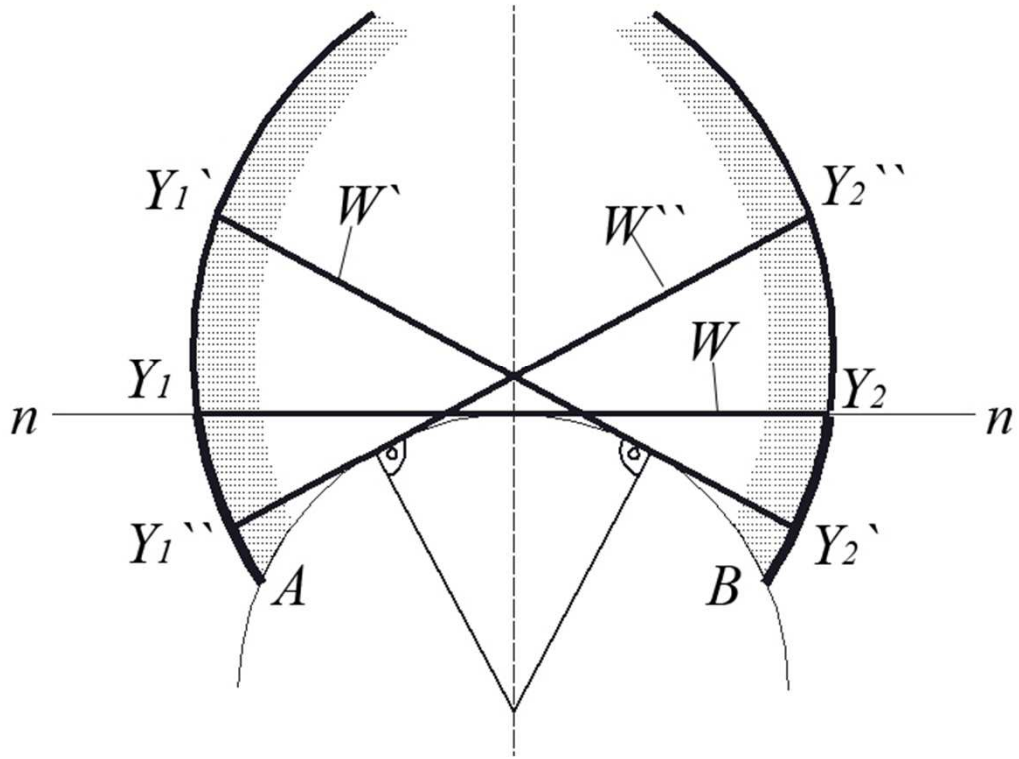
$$\overset{\frown}{MN} = \overline{NY}$$

$$\overset{\frown}{MN} = r_b.\nu_Y = r_b\left(\alpha_Y + inv\alpha_Y\right)$$

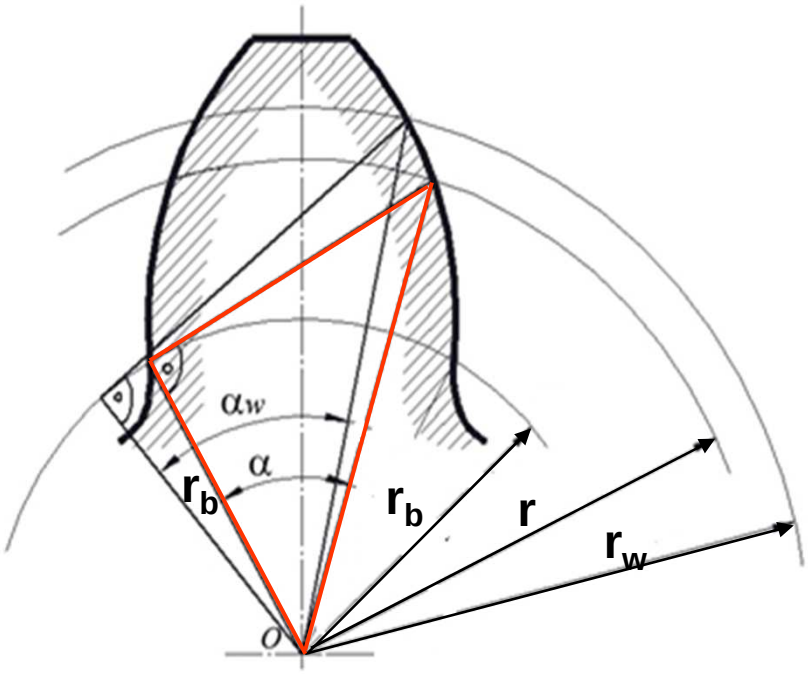
$$\overline{NY} = r_b tg\alpha_Y$$

Уравнения на еволвентата в полярни координати

Свойства на еволвентата



$$W = W' = W'' = A\widehat{B} = const$$


αw
α
rb
rb
r
rw
O

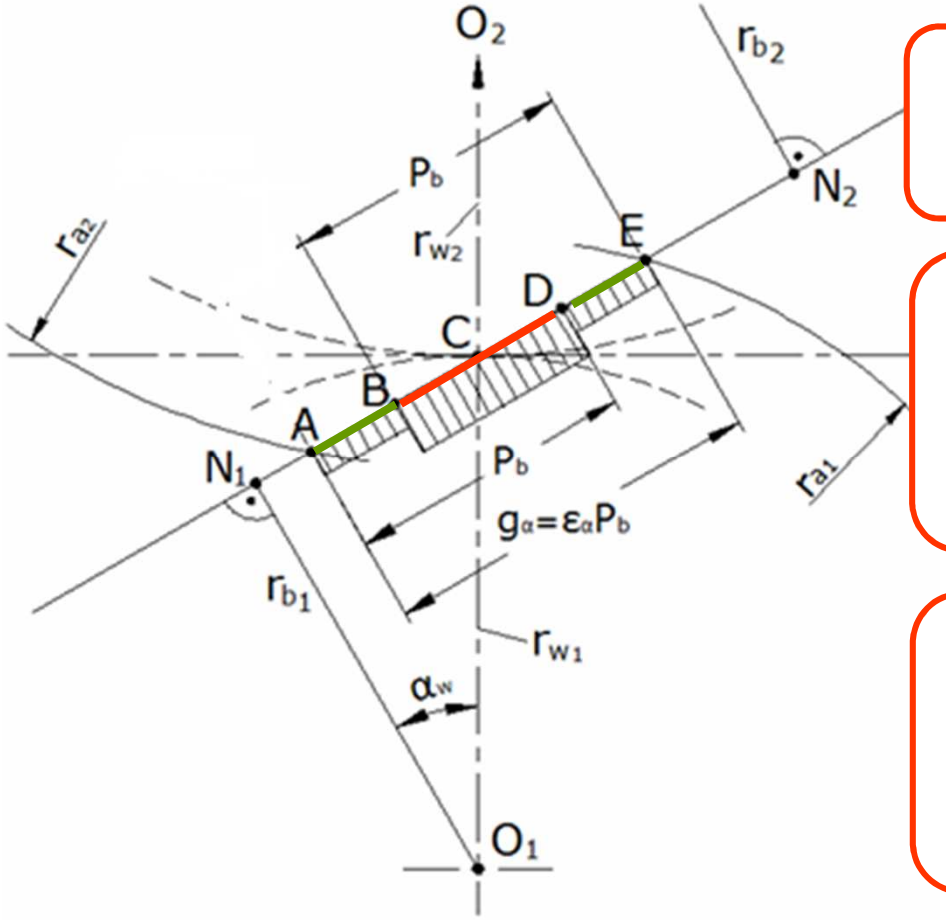
$$\pi d = pz \Rightarrow p = \frac{\pi}{z} d$$

p_b - стъпка по основната окръжност

p_w - стъпка по началната окръжност

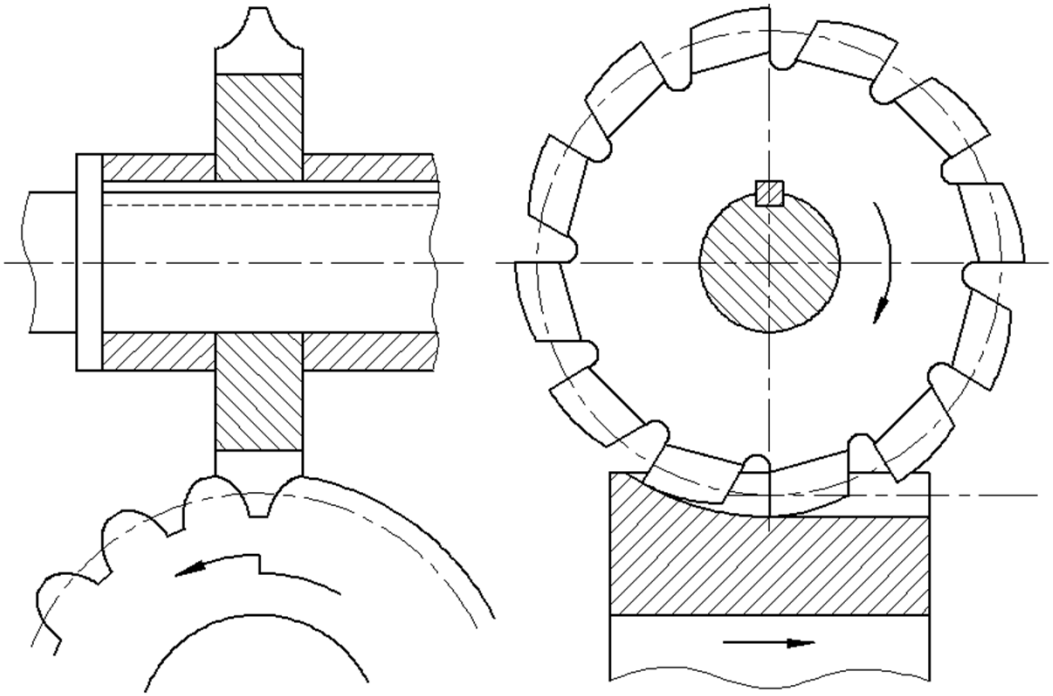
Коефициент на припокриване

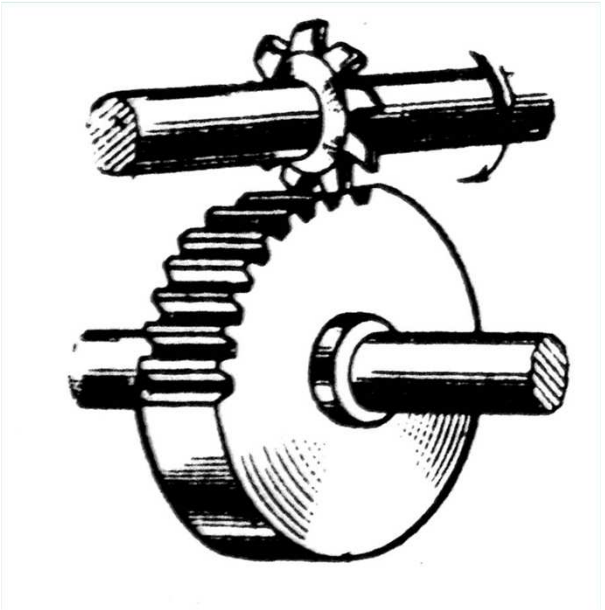
За да работят съвместно две ЗК е необходимо:

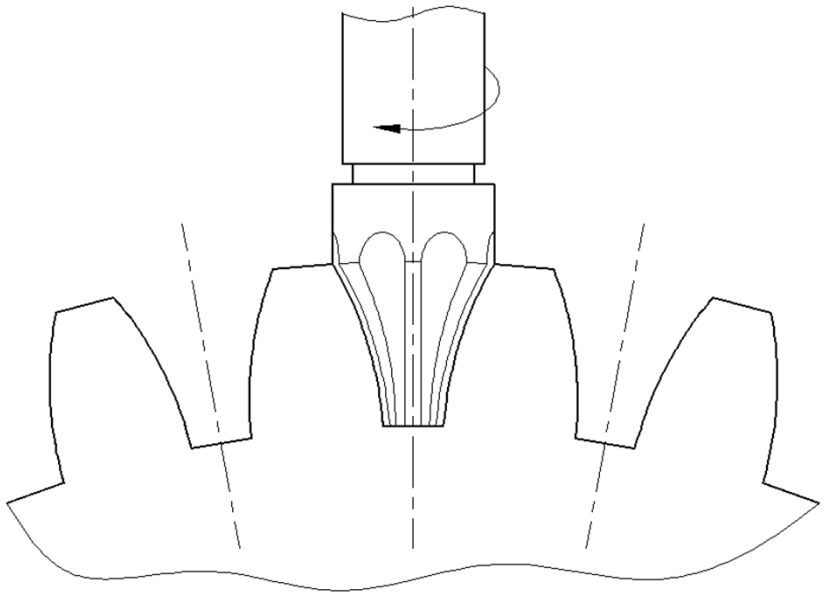


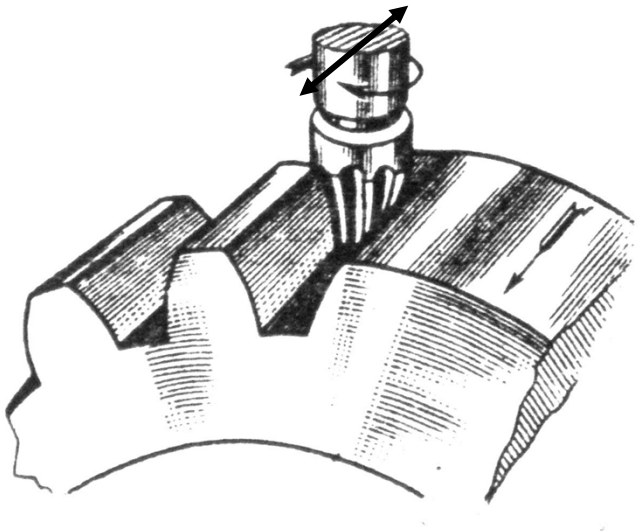
Въпрос № 10

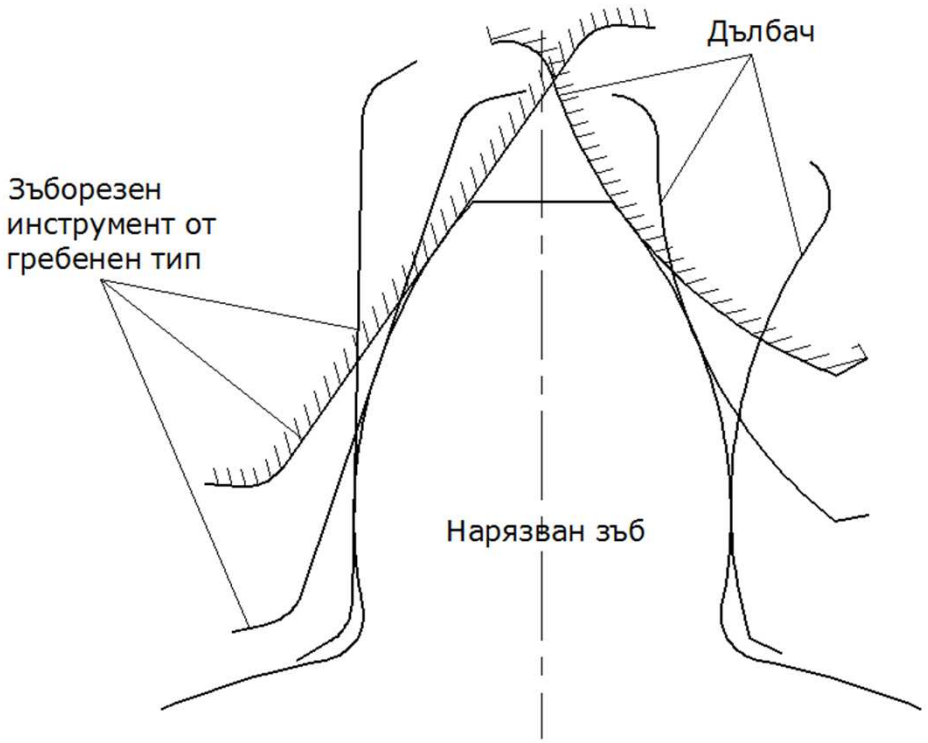
МЕТОДИ ЗА ИЗРАБОТВАНЕ НА ЦИЛИНДРИЧНИ ЗЪБНИ КОЛЕЛА С ЕВОЛВЕНТНИ ЗЪБИ. ИЗХОДНИ КОНТУРИ. МОДИФИЦИРАНИ ИЗХОДНИ КОНТУРИ.

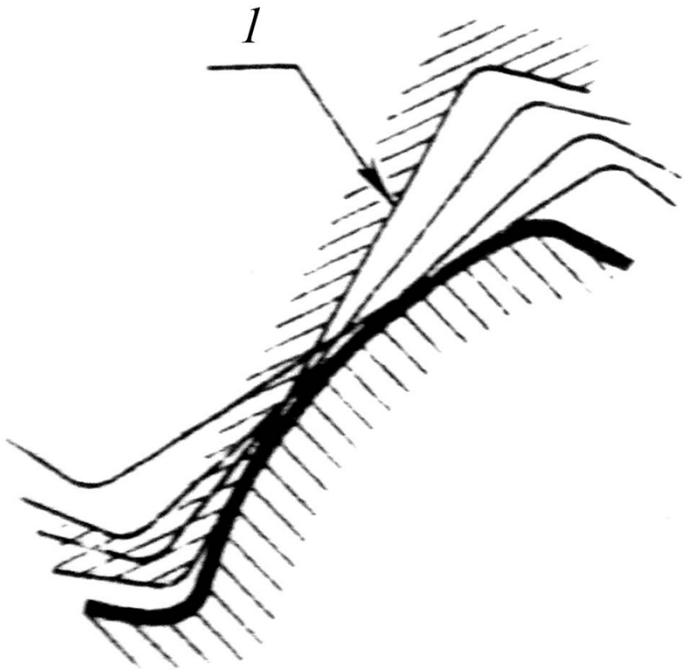




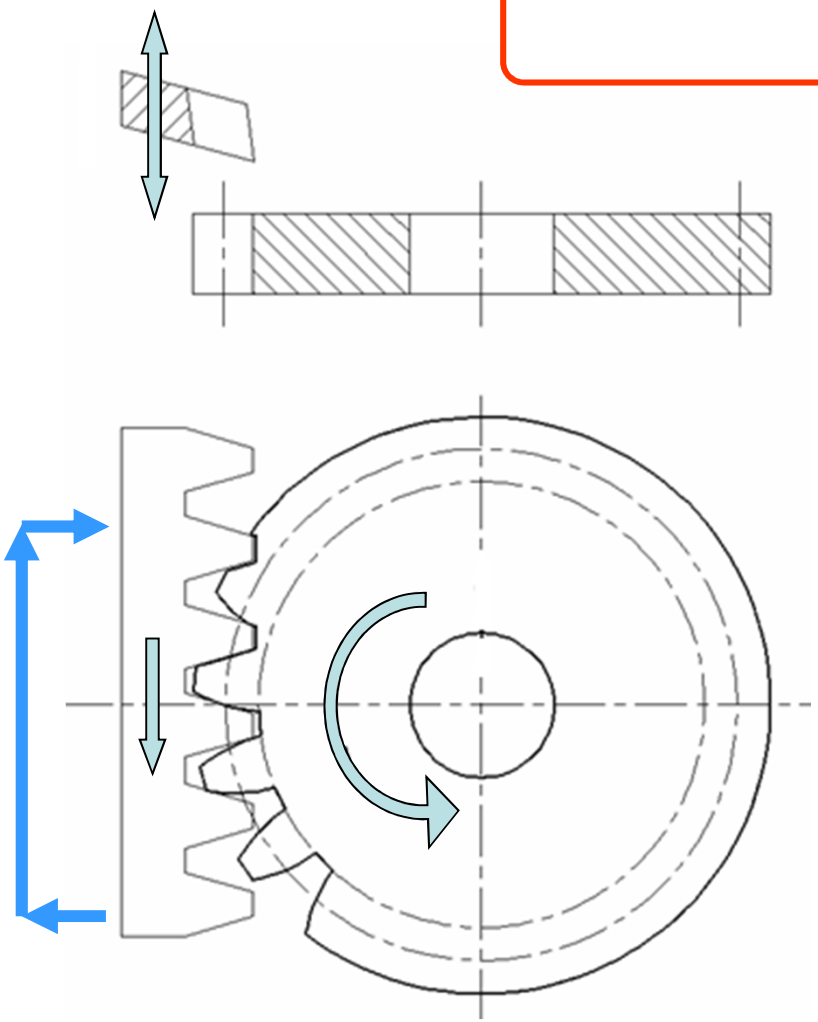


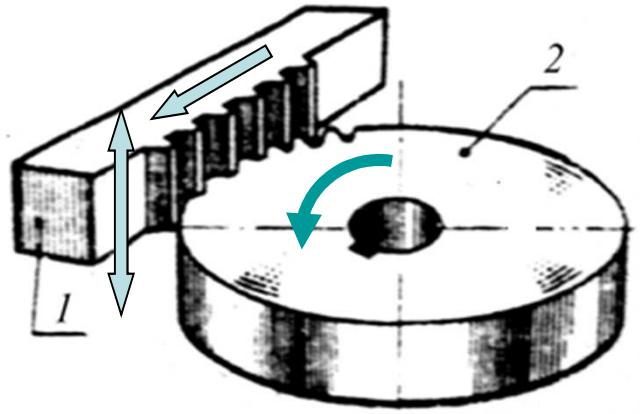


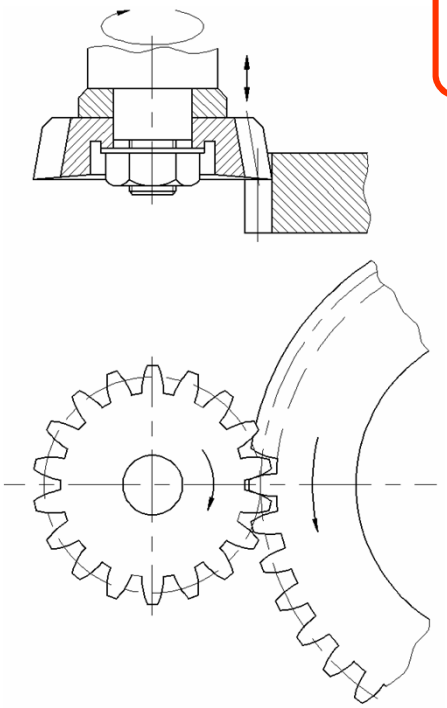

Дълбач
Зъборезен
инструмент от
гребенен тип
Нарязван зъб

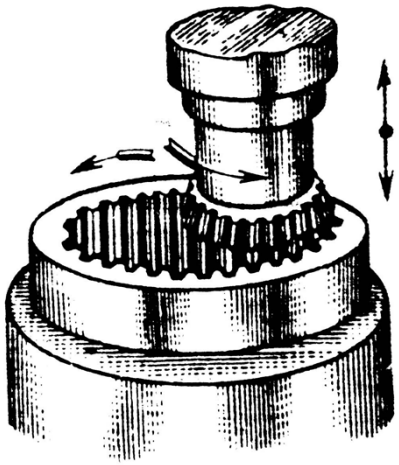

1

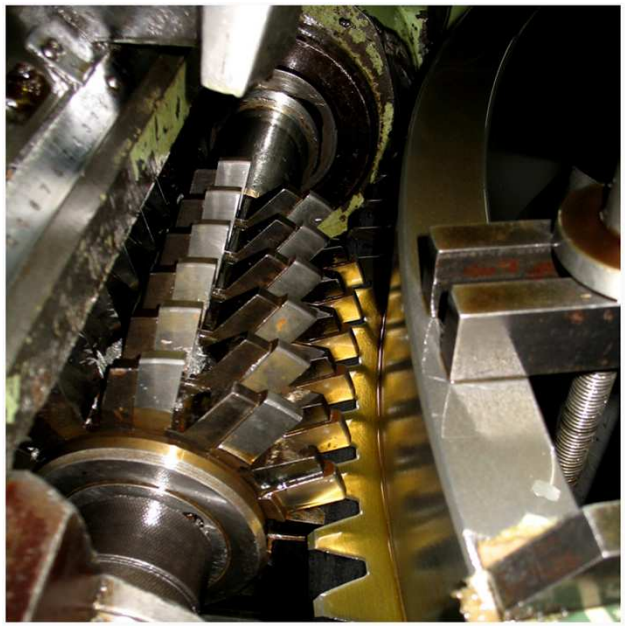
Инструментални схеми

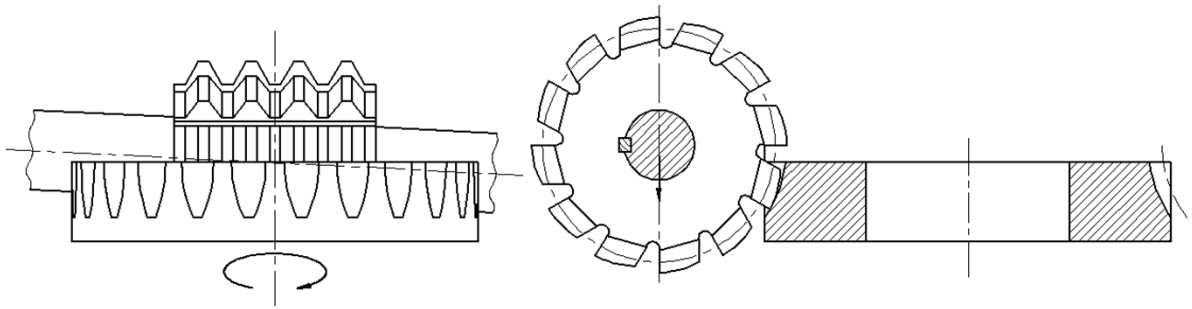


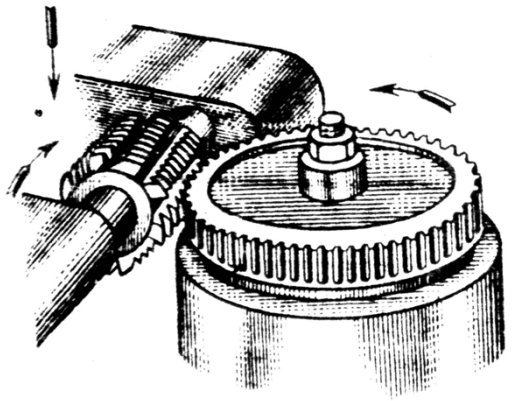




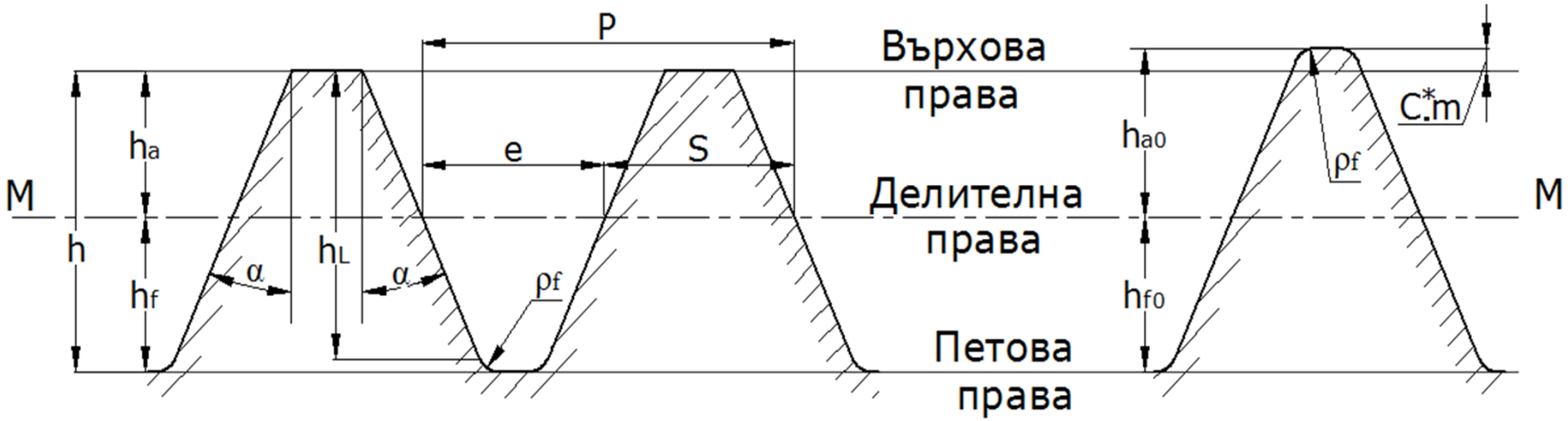


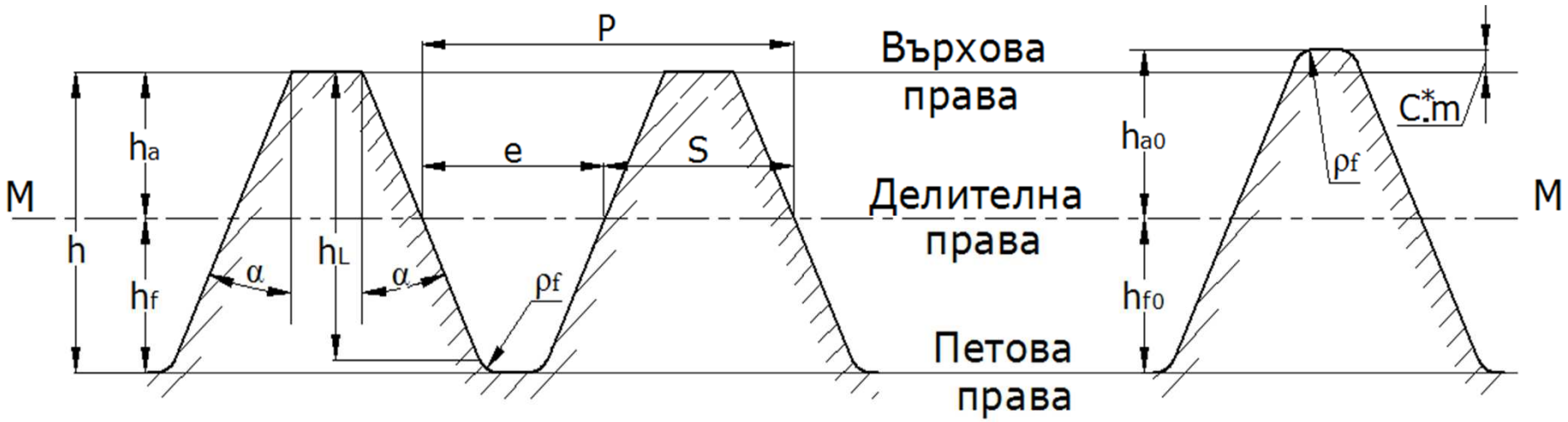






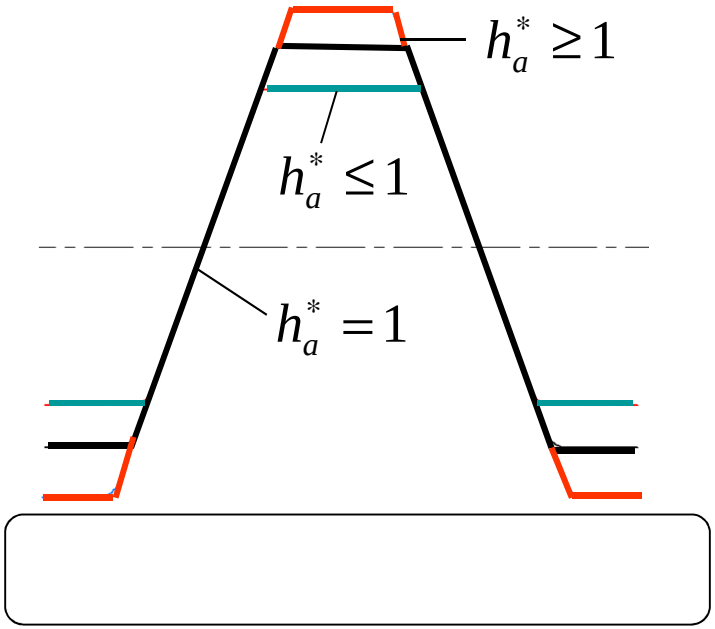
Изходен контур. Изходен произвеждащ контур

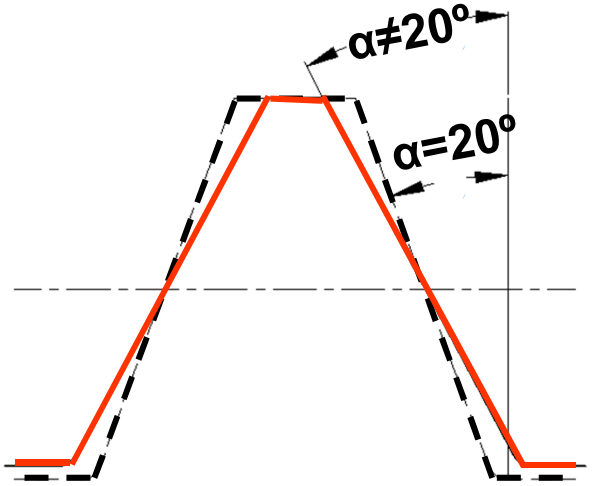


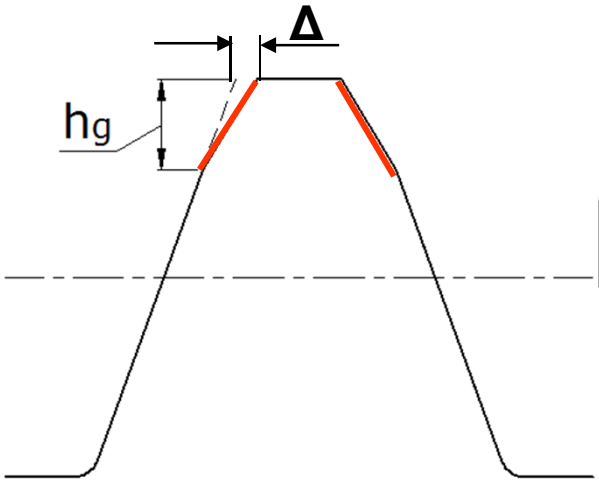


Размери на стандартен изходен контур

Модифицирани изходни контури



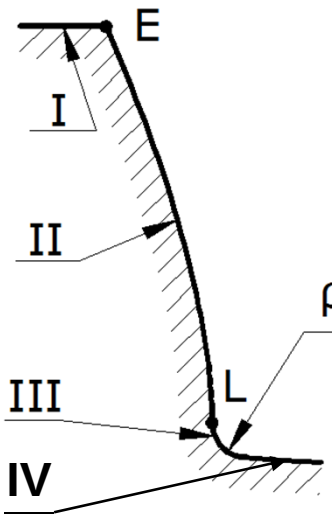




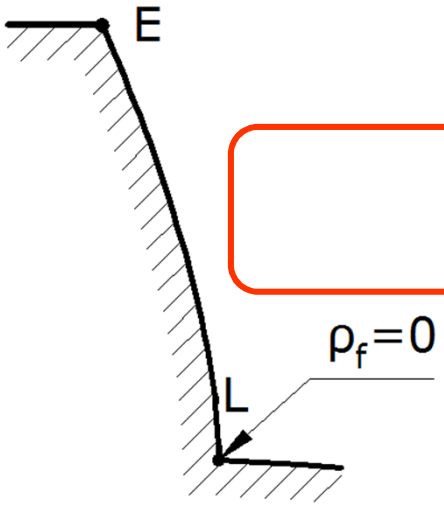
Въпрос № 11

ПРЕХОДНА КРИВА. ПОДРЯЗВАНЕ НА ЗЪБИТЕ. МИНИМАЛЕН БРОЙ ЗЪБИ СВОБОДНИ ОТ ПОДРЯЗВАНЕ. МОДИФИКАЦИИ НА ЗЪБНИЯ ПРОФИЛ

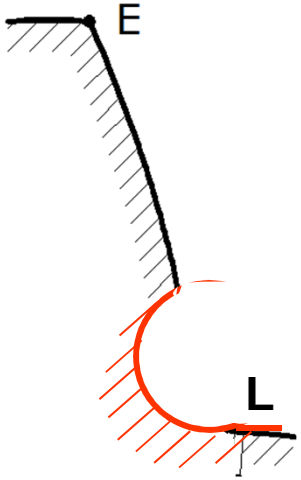
Преходна крива



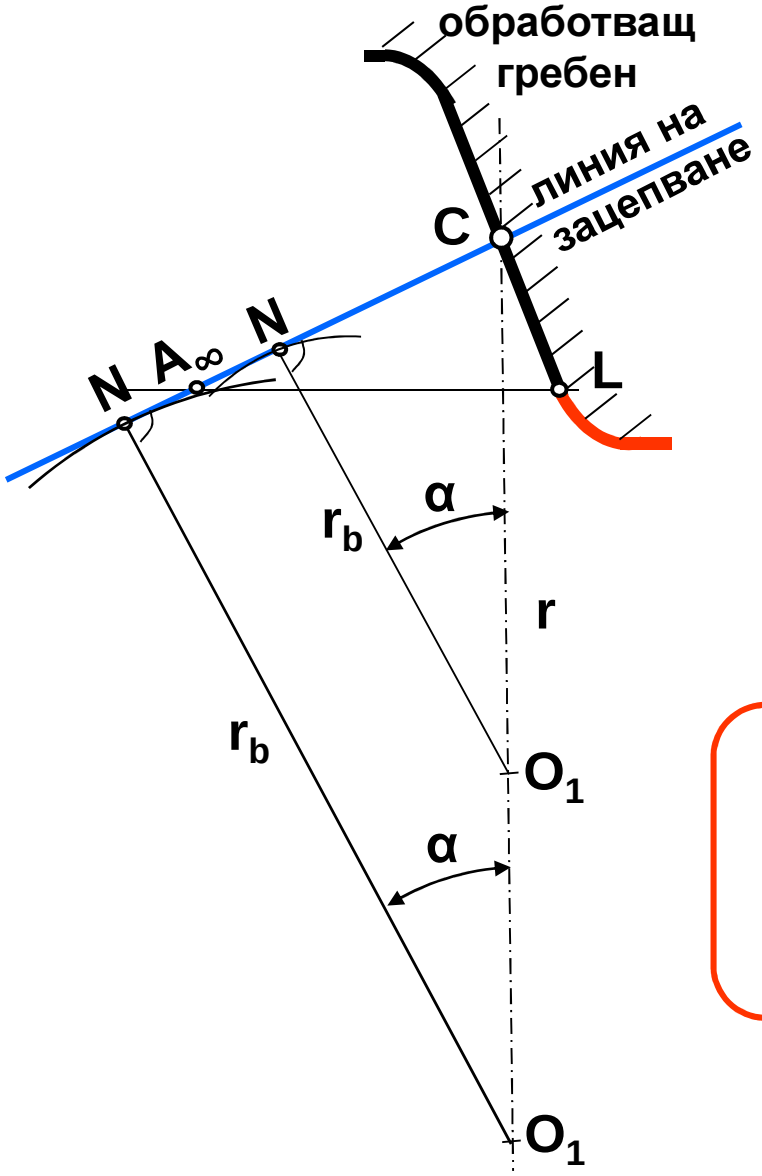
ρ_f=const

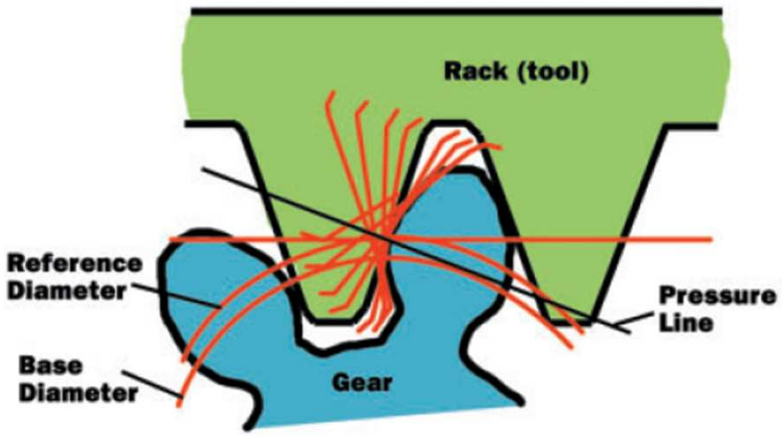


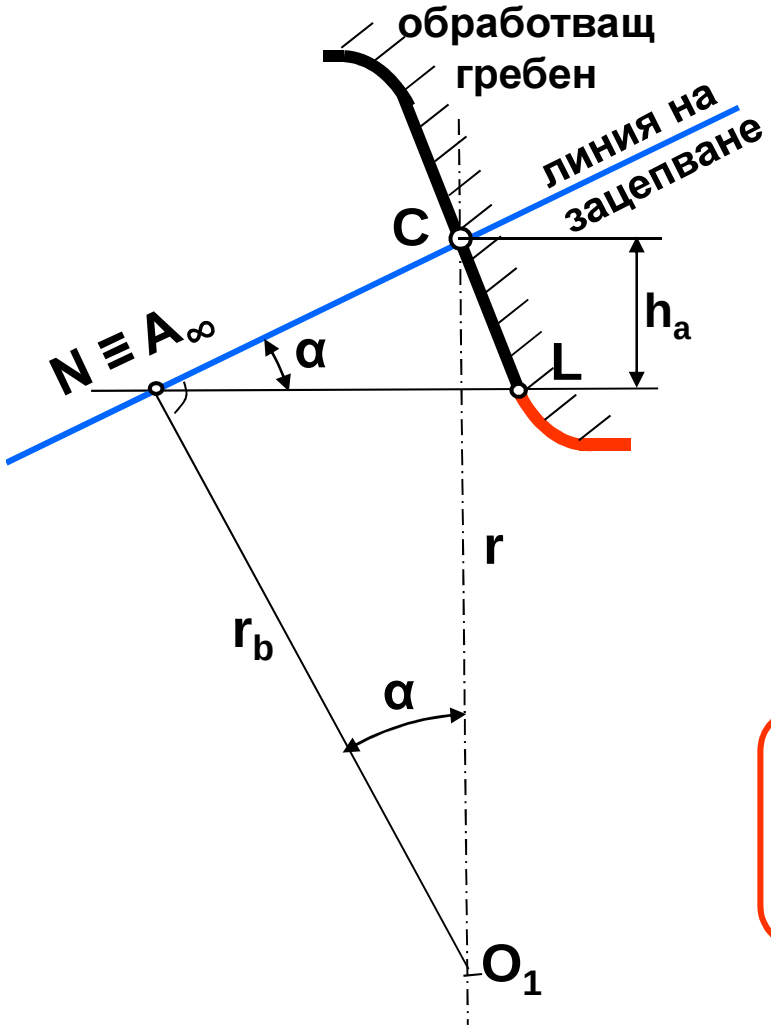
ρ_f=0



Подрязване в основата на зъбите







В граничен случай :

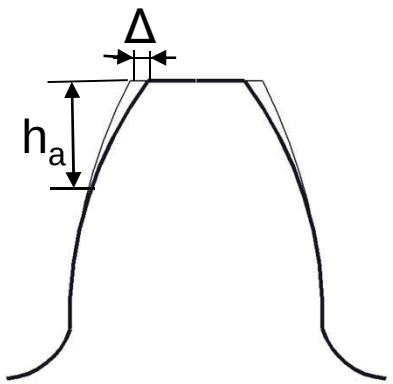
За стандартен изходен контур :

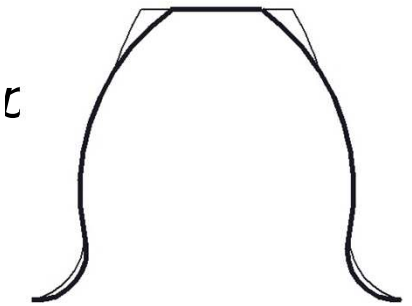
$$h_a^* = 1, \alpha = 20^0$$

!

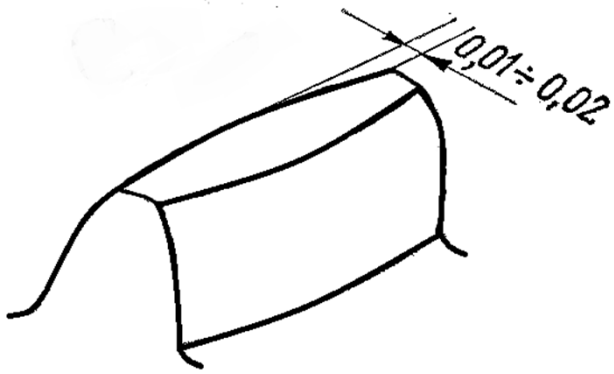
!

Модификации на зъбния профил





Модификации на зъбния профил

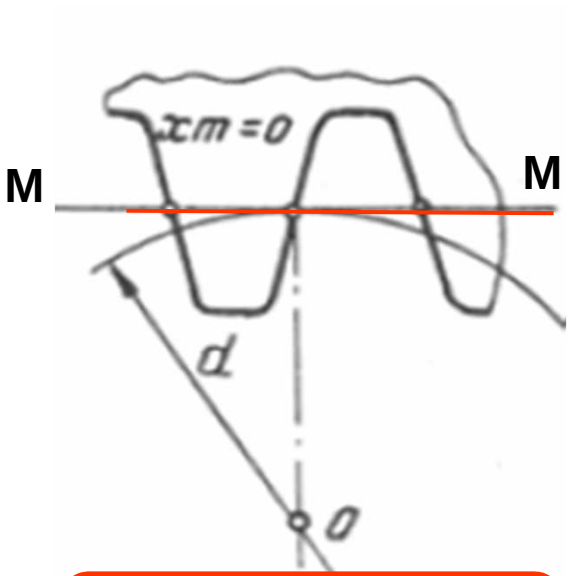


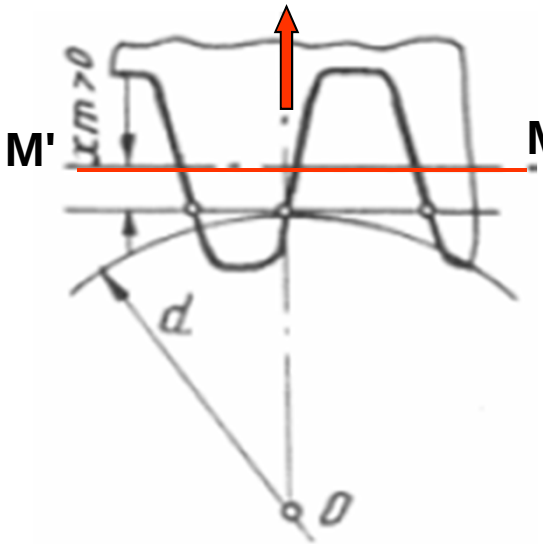
Въпрос № 12

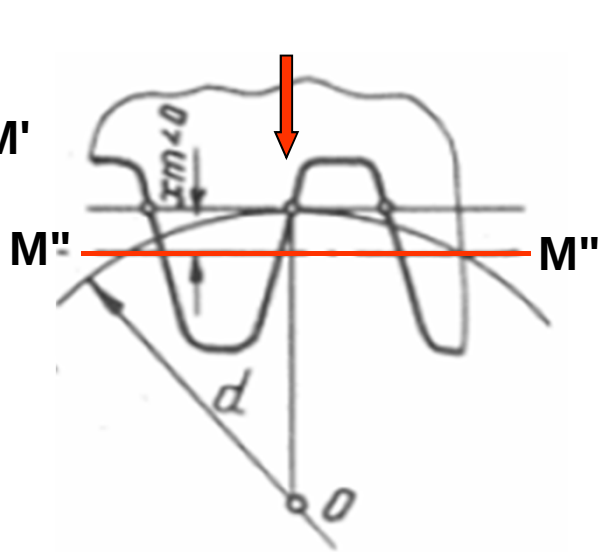
КОРЕКЦИЯ ЧРЕЗ ИЗМЕСТВАНЕ. ГРАНИЦИ НА ИЗМЕНЕНИЕ НА КОЕФИЦИЕНТА НА ИЗМЕСТВАНЕ

V = xm ⟶ изместване

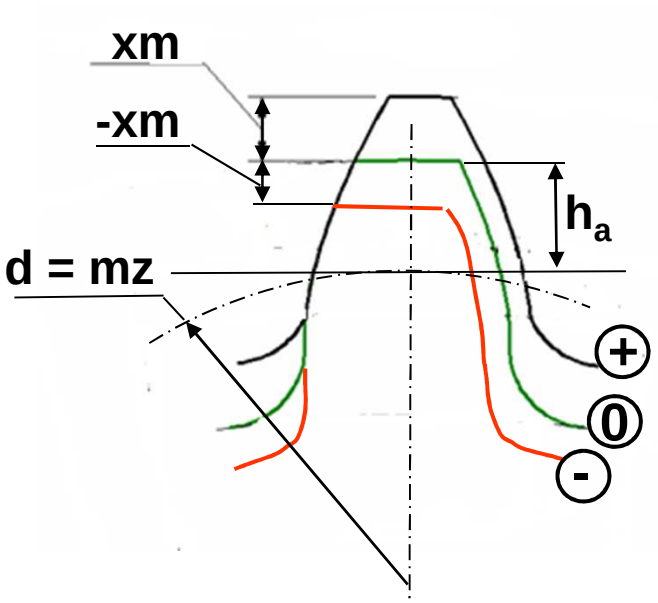
x ⟶ коефициент на изместване



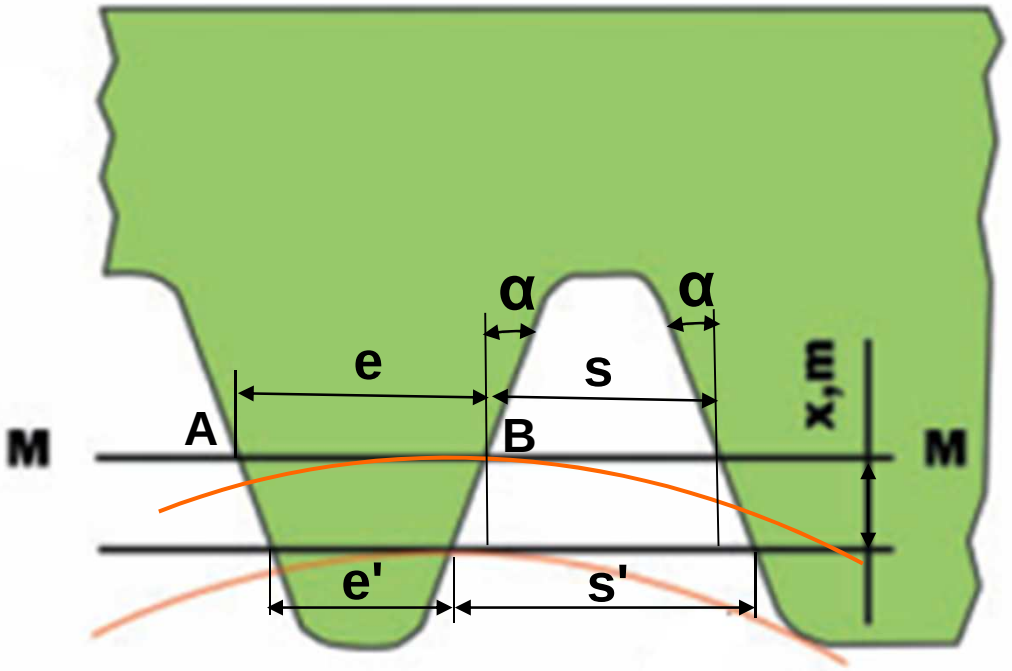




Изменение на размерите и формата на зъбите



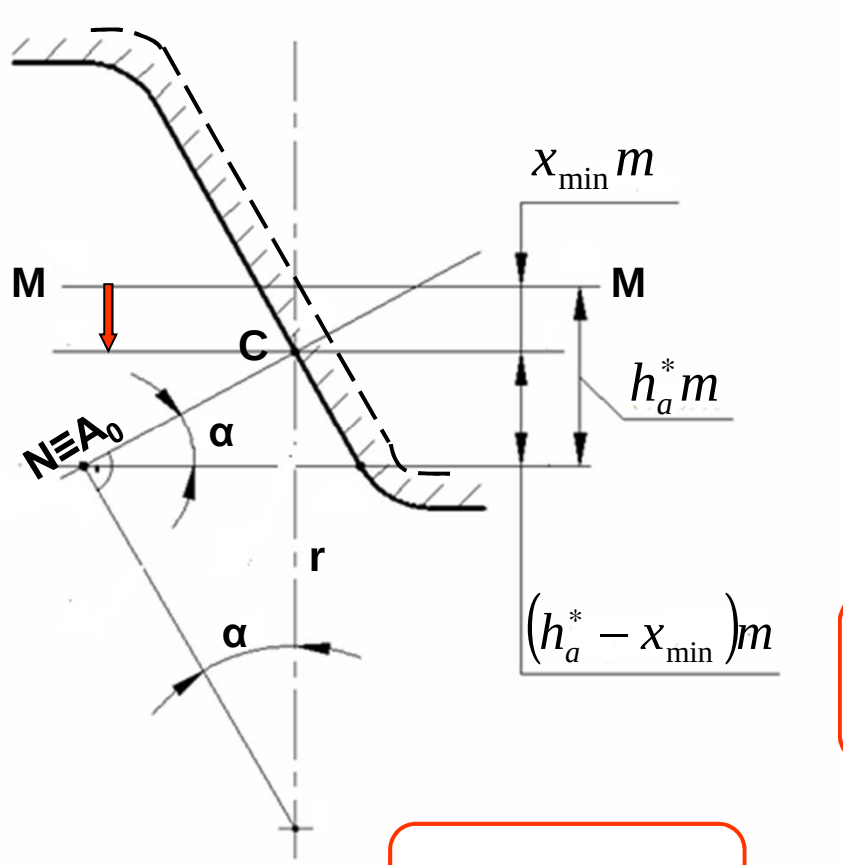
Изменение в дебелината на зъба и ширината на междузъбието



$$\hat{s} = \hat{e} = A\overline{B}$$

$$s = e = \frac{p}{2} = \frac{\pi m}{2}$$

Граници на изменение на коефициента на изместване

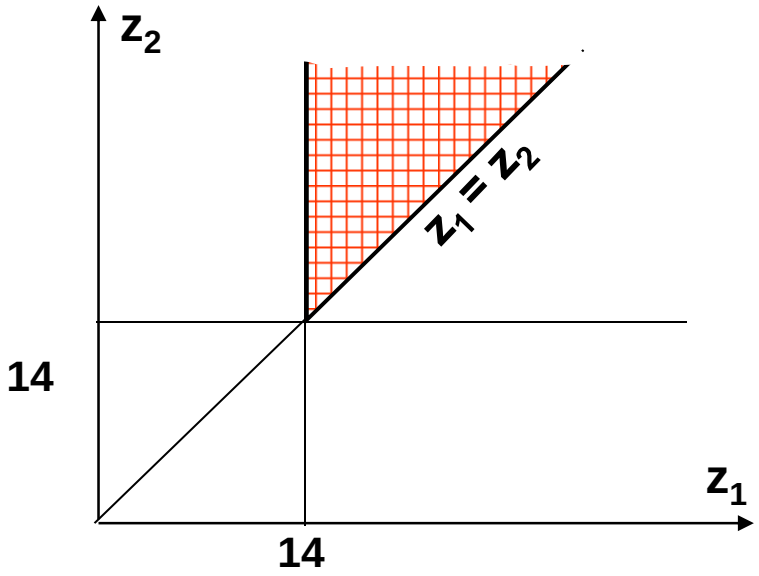


$$s_a \geq s_{a\,\min} = 0{,}2m$$

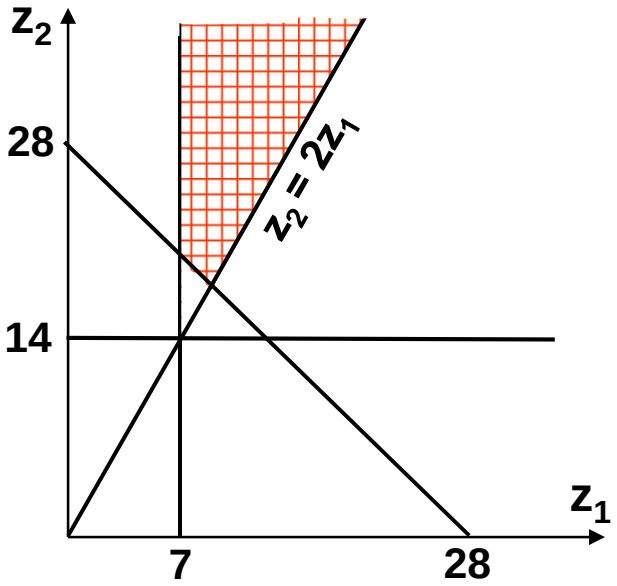
Въпрос № 13

ВИДОВЕ ЗАЦЕПВАНИЯ НА ЦИЛИНДРИЧНИ ЗЪБНИ КОЛЕЛА – НУЛЕВО , РАВНОИЗМЕСТЕНО И ИЗМЕСТЕНО ЗАЦЕПВАНЕ

1. Нулево зацепване – зацепване между две “нулеви” ЗК



2. Равноизместено зацепване



3. Изместено зацепване