



FAKULTET TEHNIČKIH NAUKA  
DEPARTMAN ZA GRAĐEVINARSTVO I GEODEZIJU  
LABORATORIJA ZA GEODEZIJU



# INŽENJERSKA GEODEZIJA 1

Profesor: Doc. dr Mehmed Batilović, mast. inž. geod.

[mehmed@uns.ac.rs](mailto:mehmed@uns.ac.rs)

Asistent: Đuro Krnić, mast. inž. geodez.

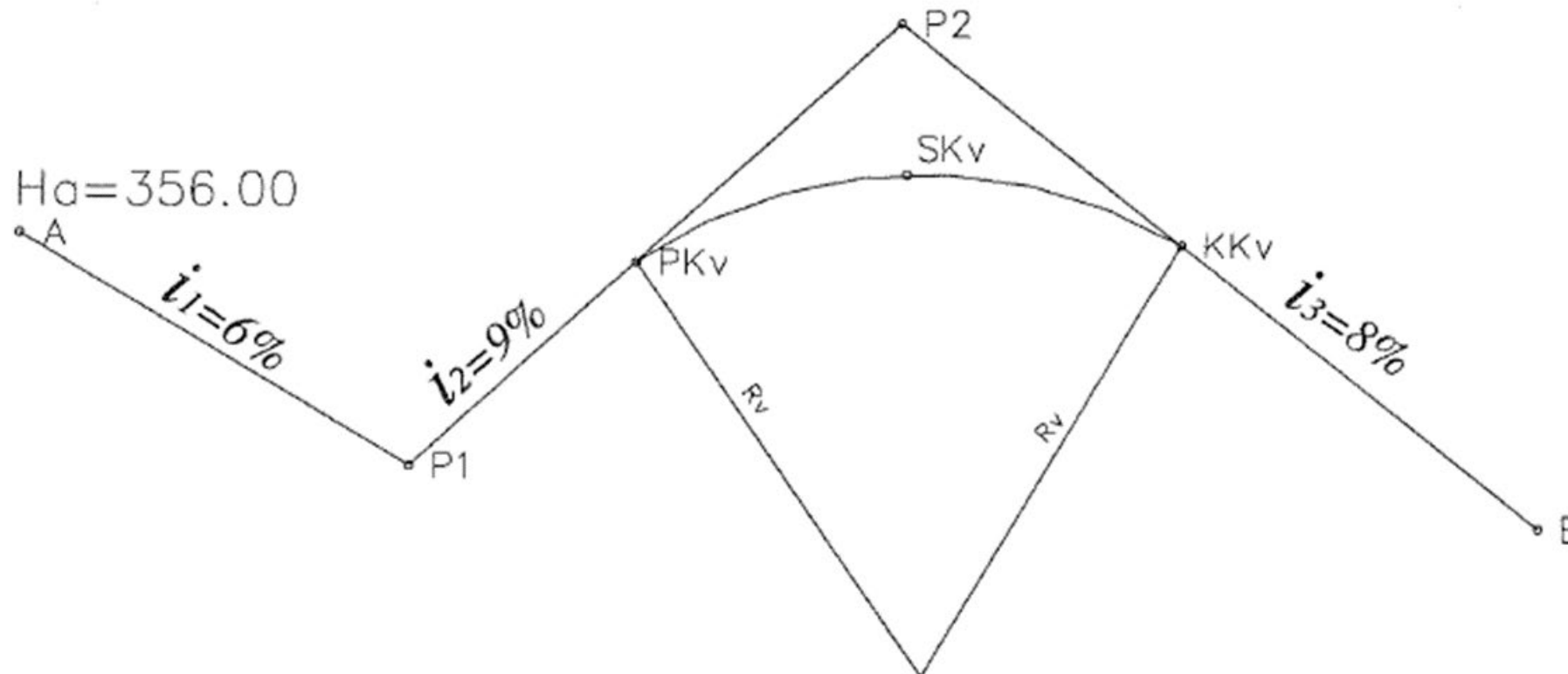
[djuro.geo@uns.ac.rs](mailto:djuro.geo@uns.ac.rs)



# Vežba 4 VERTIKALNA KRIVINA

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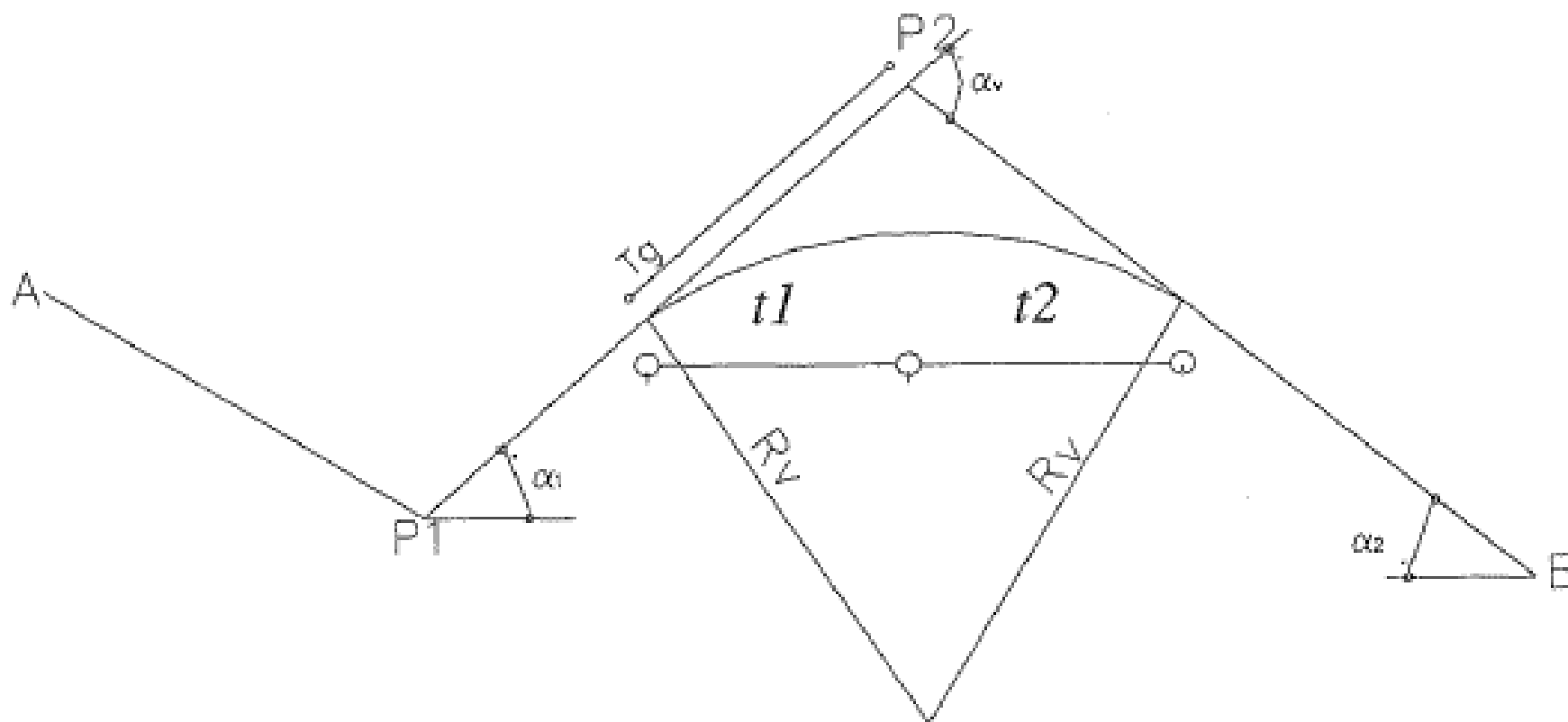
- Izračunati kote temena
- Izračunati kote nivelete na svakih 20m



# Vežba 4 VERTIKALNA KRIVINA

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- Vertikalni skretni ugao  $\alpha_V$
- Tetiva, tangenta



# Vežba 4 VERTIKALNA KRIVINA

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$$H_1 = 356.00m$$

$$H_{P1} = H_A - 257.00 * \frac{i_1}{100} =$$

$$H_{P2} = H_{P1} + 340.00 * \frac{i_2}{100} =$$

$$H_B = H_{P2} - 400.00 * \frac{i_3}{100} =$$



# Vežba 4 VERTIKALNA KRIVINA

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$$H_1 = 356.00m$$

$$H_{P1} = H_A - 257.00 * \frac{i_1}{100} = 340.58m$$

$$H_{P2} = H_{P1} + 340.00 * \frac{i_2}{100} = 371.18m$$

$$H_B = H_{P2} - 400.00 * \frac{i_3}{100} = 339.18m$$



# Vežba 4

$$\alpha_1 = \arctan \frac{i_2}{100}$$

$$Tg = Rv \cdot \tan \frac{\alpha_v}{2}$$

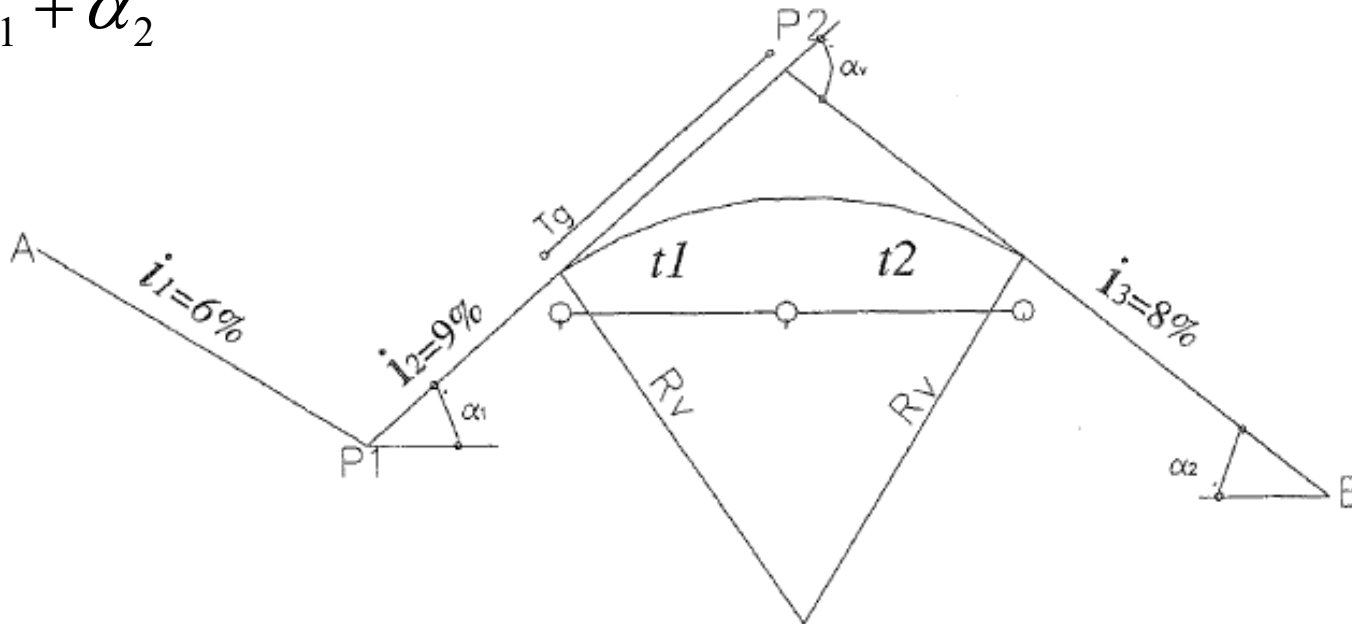
$$H_{PVK} = H_{P2} - t_1 \frac{i_2}{100}$$

$$\alpha_2 = \arctan \frac{i_3}{100}$$

$$t_1 = Tg \cdot \cos \alpha_1$$

$$H_{KVK} = H_{P2} - t_2 \frac{i_3}{100}$$

$$\alpha_v = \alpha_1 + \alpha_2$$



# Vežba 4 VERTIKALNA KRIVINA

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Vertikalna krivina  $\longrightarrow$  Vertikalni skretni ugao ( $\alpha_v$ )

Nema koordinata, nema direkcioni ugao  $\longrightarrow$  Mora preko  $\alpha_1$  i  $\alpha_2$

$$\alpha_1 = \operatorname{arctg} \frac{i_2}{100}$$

$$\alpha_2 = \operatorname{arctg} \frac{i_3}{100}$$

$$\alpha_v = \alpha_1 + \alpha_2$$

$$\alpha_1 =$$

$$\alpha_2 =$$

$$\alpha_v =$$

$$T_g = R_v * \tan \frac{\alpha_v}{2} =$$

$$t_1 = T_g * \cos \alpha_1$$

$$t_2 = T_g * \cos \alpha_2 =$$

$$t_1 =$$

$$t_2 =$$



# Vežba 4 VERTIKALNA KRIVINA

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Vertikalna krivina  $\longrightarrow$  Vertikalni skretni ugao ( $\alpha_v$ )

Nema koordinata, nema direkcioni ugao  $\longrightarrow$  Mora preko  $\alpha_1$  i  $\alpha_2$

$$\alpha_1 = \operatorname{arctg} \frac{i_2}{100}$$

$$\alpha_2 = \operatorname{arctg} \frac{i_3}{100}$$

$$\alpha_v = \alpha_1 + \alpha_2$$

$$\alpha_1 = 5^\circ 8' 34''$$

$$\alpha_2 = 4^\circ 34' 26''$$

$$\alpha_v = 9^\circ 43' 00''$$

$$T_g = R_v * \tan \frac{\alpha_v}{2} = 42.499m$$

$$t_1 = T_g * \cos \alpha_1$$

$$t_2 = T_g * \cos \alpha_2$$

$$t_1 = 42.328m$$

$$t_2 = 42.364m$$





# Vežba 4 VERTIKALNA KRIVINA

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$$H_{PV} = H_{P2} - t_1 * \frac{i_2}{100} =$$

$$H_{KV} = H_{P2} - t_2 * \frac{i_3}{100} =$$



# Vežba 4 VERTIKALNA KRIVINA

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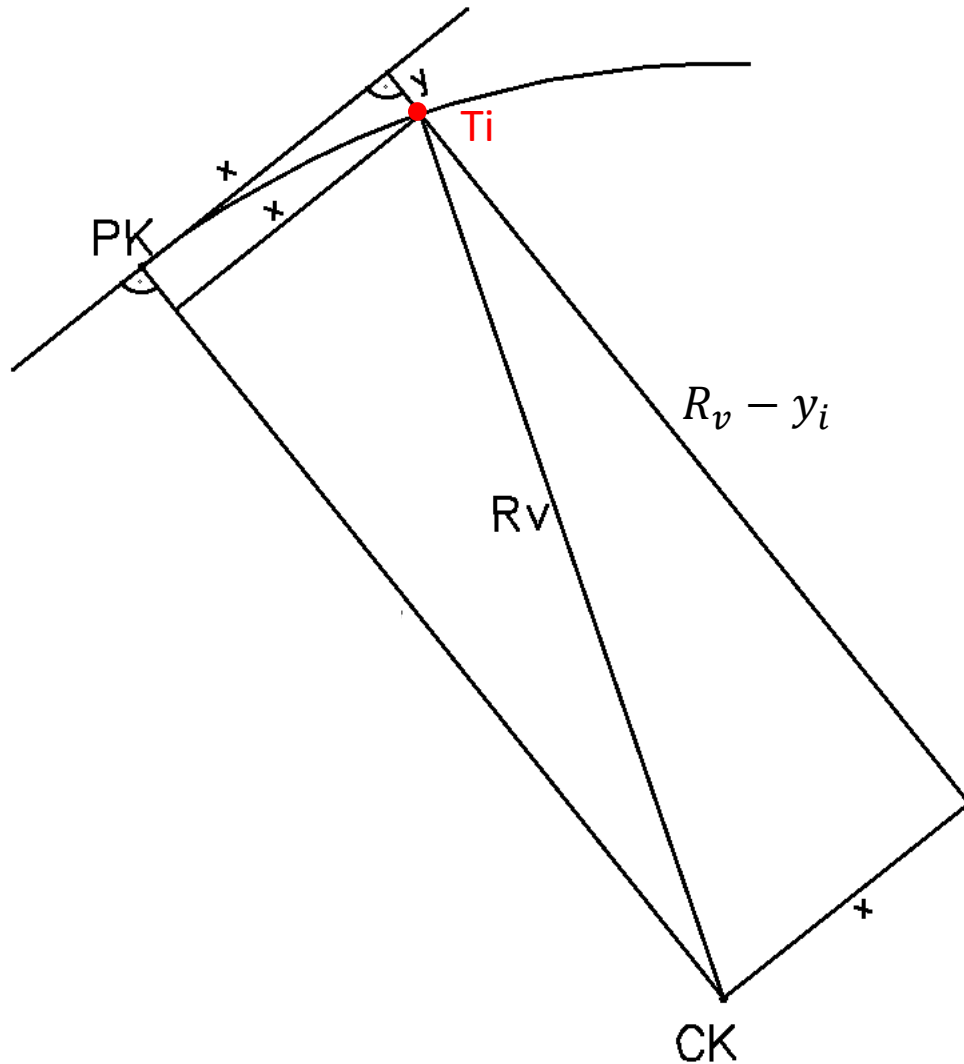
$$H_{PV} = H_{P2} - t_1 * \frac{i_2}{100} = 367.37m$$

$$H_{KV} = H_{P2} - t_2 * \frac{i_3}{100} = 367.79m$$



# Vežba 4 VERTIKALNA KRIVINA

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$$R_v^2 = x_i^2 + (R_v - y_i)^2$$

$$(R_v - y_i)^2 = R_v^2 - x_i^2 / \sqrt{\quad}$$

$$R_v - y_i = \sqrt{R_v^2 - x_i^2}$$

$$y_i = R_v - \sqrt{R_v^2 - x_i^2}$$

u produžetku y

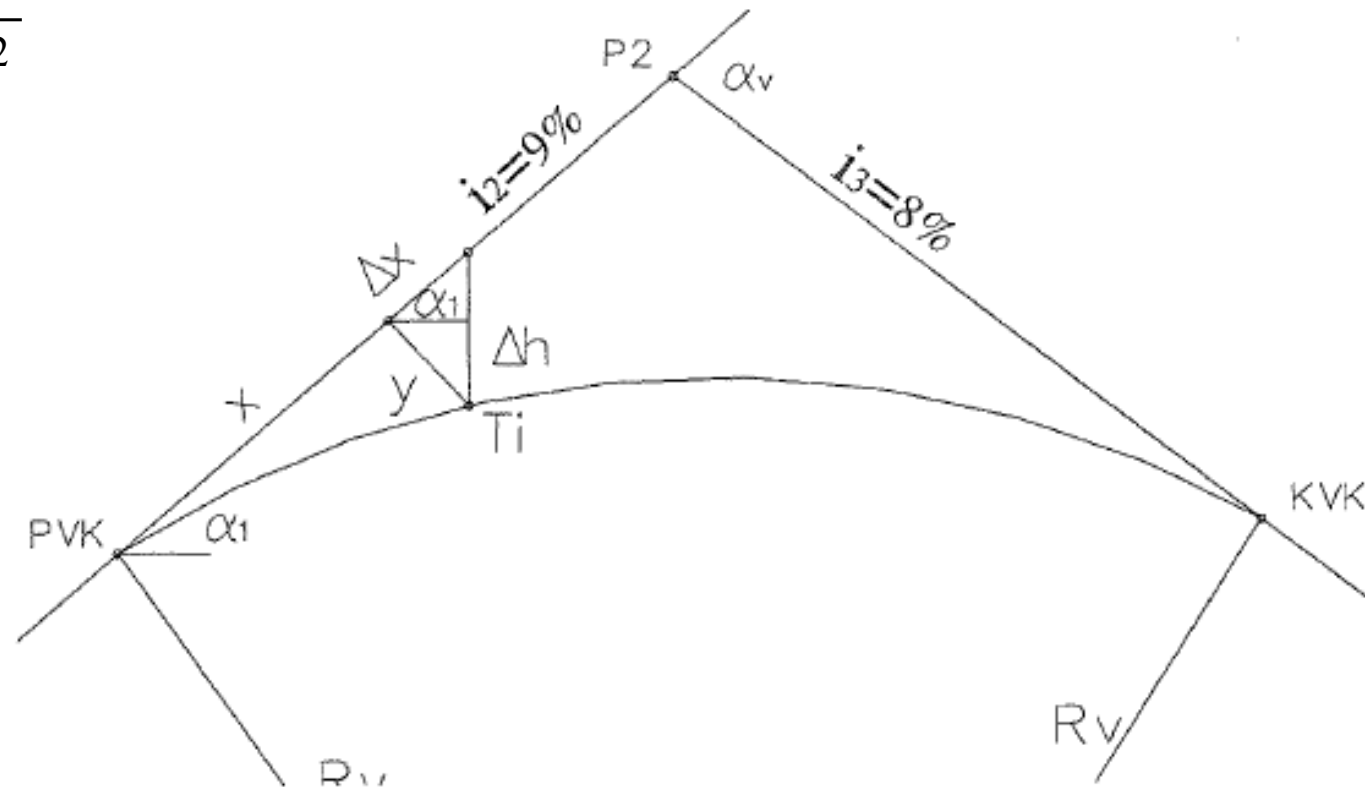
# Vežba 4 VERTIKALNA KRIVINA

- Kota nivelete- elementi trouglova

$$y_i = Rv - \sqrt{Rv^2 - x_i^2}$$

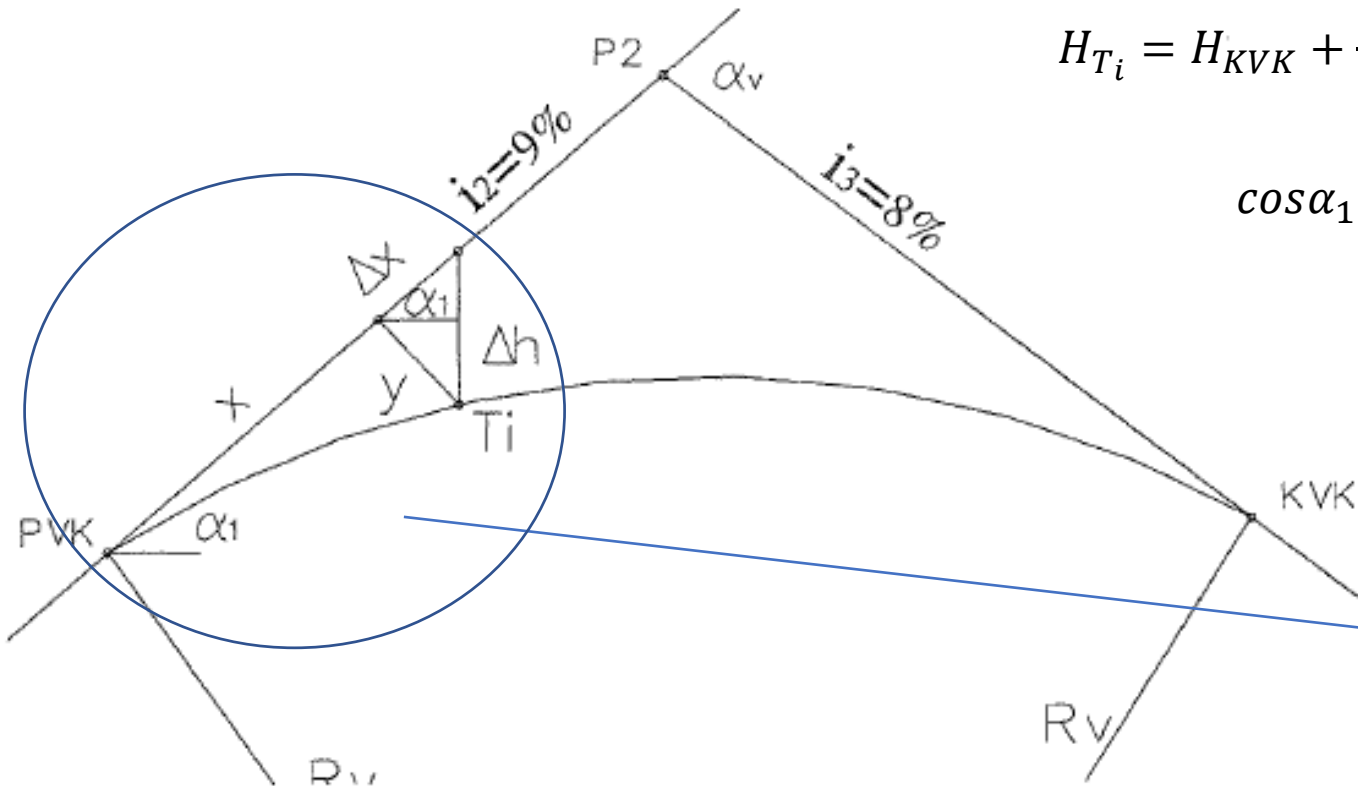
$$\Delta x_i = y_i \cdot \tan \alpha_1$$

$$\Delta h_i = \frac{y_i}{\cos \alpha_1}$$



# Vežba 4 VERTIKALNA KRIVINA

- Kota nivelete

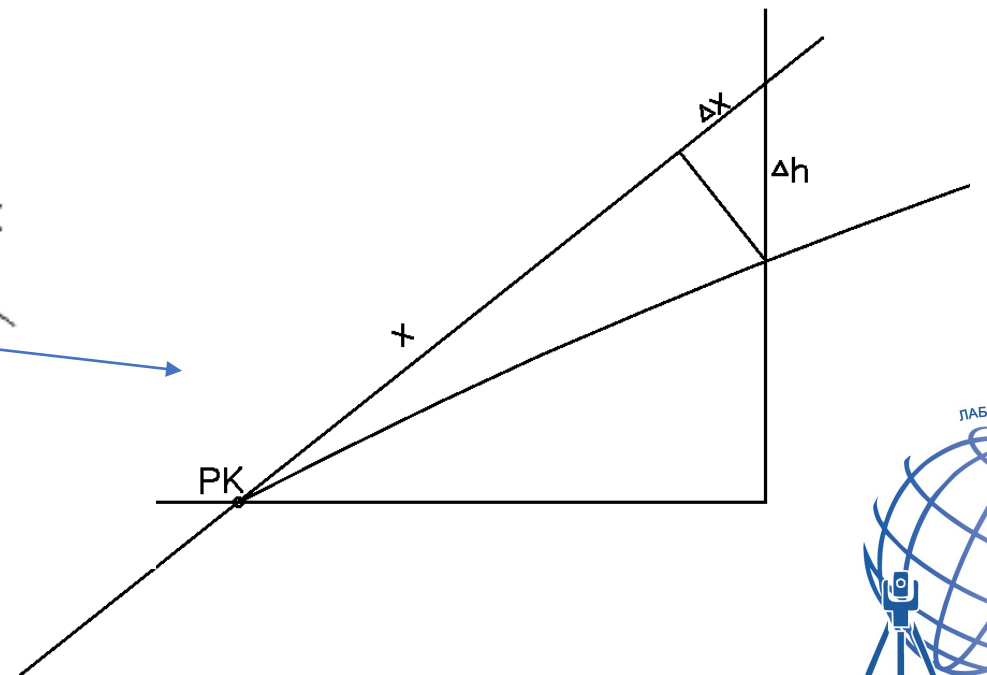


horizontalna dužina

$$H_{Ti} = H_{PVK} + \frac{i_2}{100} \overbrace{(x_i + \Delta x_i) \cos \alpha_1}^{\text{horizontalna dužina}} - \Delta h_i$$

$$H_{Ti} = H_{KVK} + \frac{i_3}{100} (x_i + \Delta x_i) \cos \alpha_2 - \Delta h_i$$

$$\cos \alpha_1 = \frac{d}{x + \Delta x} \longrightarrow d = \cos \alpha_1 (x + \Delta x)$$



# Vežba 4 VERTIKALNA KRIVINA

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- Podatke prikazati tabelarno

Ti	xi [m]	yi [m]	$\Delta xi$ [m]	$\Delta hi$ [m]	HTi [m]	Napomena
1	20	-	-	-	-	Računato od PVK
2	40	-	-	-	-	
3	20	-	-	-	-	Računato od KVK
4	40	-	-	-	-	

# Vežba 4 VERTIKALNA KRIVINA

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- Podatke prikazati tabelarno

Ti	xi [m]	yi [m]	$\Delta xi$ [m]	$\Delta hi$ [m]	HTi [m]	Napomena
1	20	0,400	0,036	0,402	368,771	Računato od PVK
2	40	1,603	0,144	1,609	369,374	
3	20	0,400	0,032	0,401	368,992	Računato od KVK
4	40	1,603	0,128	1,608	369,392	

