



$$\begin{aligned}
 "0" &\rightarrow \gamma_0 = -\alpha_0 \\
 "+\beta" &\rightarrow \gamma_{+\beta} = \beta - \alpha_0 \\
 "-\beta" &\rightarrow \gamma_{-\beta} = -\alpha_0 - \beta \\
 "90" &\rightarrow \gamma_{90} = 90 - \alpha_0
 \end{aligned}$$

## РОЗЕТА ДЕФОРМАЦИЈА

$$\begin{aligned}
 ① \quad \epsilon_0 &= \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos(-2\alpha_0) = \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos 2\alpha_0 \\
 ② \quad \epsilon_{+\beta} &= \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos 2(\beta - \alpha_0) = \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos 2\beta \cos 2\alpha_0 + \frac{\epsilon_1 - \epsilon_2}{2} \sin 2\beta \sin 2\alpha_0 \\
 ③ \quad \epsilon_{-\beta} &= \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos 2(-\alpha_0 - \beta) = \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos 2\beta \cos 2\alpha_0 - \frac{\epsilon_1 - \epsilon_2}{2} \sin 2\beta \sin 2\alpha_0 \\
 ④ \quad \epsilon_{90} &= \frac{\epsilon_1 + \epsilon_2}{2} + \frac{\epsilon_1 - \epsilon_2}{2} \cos 2(90 - \alpha_0) = \frac{\epsilon_1 + \epsilon_2}{2} - \frac{\epsilon_1 - \epsilon_2}{2} \cos 2\alpha_0
 \end{aligned}$$

$$② - ③ \quad \epsilon_{+\beta} - \epsilon_{-\beta} = (\epsilon_1 - \epsilon_2) \sin 2\beta \sin 2\alpha_0 \Rightarrow (\epsilon_1 - \epsilon_2) \sin 2\alpha_0 = \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{\sin 2\beta} \quad (A)$$

$$② + ③ \quad \epsilon_{+\beta} + \epsilon_{-\beta} = (\epsilon_1 + \epsilon_2) + (\epsilon_1 - \epsilon_2) \cos 2\beta \cos 2\alpha_0 \quad (B)$$

$$2 \times ① - (B) \quad 2\epsilon_0 - \epsilon_{+\beta} - \epsilon_{-\beta} = -(\epsilon_1 - \epsilon_2) \cos 2\beta \cos 2\alpha_0 + (\epsilon_1 - \epsilon_2) \cos 2\alpha_0 \Rightarrow (\epsilon_1 - \epsilon_2) \cos 2\alpha_0 = \frac{2\epsilon_0 - \epsilon_{+\beta} - \epsilon_{-\beta}}{1 - \cos 2\beta} \quad (C)$$

$$A/C \quad \tan 2\alpha_0 = \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{2\epsilon_0 - \epsilon_{+\beta} - \epsilon_{-\beta}} \cdot \frac{1 - \cos 2\beta}{\sin 2\beta} \tan \beta$$

$$[① \times (-\cos 2\beta)] + [② + ③]:$$

$$-2\epsilon_0 \cos 2\beta + \epsilon_{+\beta} + \epsilon_{-\beta} = [-(\epsilon_1 + \epsilon_2) \cos 2\beta - (\epsilon_1 - \epsilon_2) \cos 2\alpha_0 \cos 2\beta] + [(\epsilon_1 + \epsilon_2) + (\epsilon_1 - \epsilon_2) \cos 2\beta \cos 2\alpha_0]$$

$$\epsilon_{+\beta} + \epsilon_{-\beta} - 2\epsilon_0 \cos 2\beta = (\epsilon_1 + \epsilon_2)(1 - \cos 2\beta) \Rightarrow \epsilon_1 + \epsilon_2 = \frac{\epsilon_{+\beta} + \epsilon_{-\beta} - 2\epsilon_0 \cos 2\beta}{1 - \cos 2\beta}$$

$$\epsilon_1 - \epsilon_2 = \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{\sin 2\beta \sin 2\alpha_0} \quad (A)$$

$$\Rightarrow \epsilon_{1,2} = \frac{\epsilon_{+\beta} + \epsilon_{-\beta} - 2\epsilon_0 \cos 2\beta}{2(1 - \cos 2\beta)} \pm \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{2 \sin 2\alpha_0 \sin 2\beta}$$

$$A^2 + C^2 \quad (\epsilon_1 - \epsilon_2)^2 (1 - \cos^2 2\beta) = \left[ \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{\sin 2\beta \sin 2\alpha_0} \right]^2 + \left[ \frac{2\epsilon_0 - \epsilon_{+\beta} - \epsilon_{-\beta}}{1 - \cos 2\beta} \right]^2$$

$$\epsilon_1 - \epsilon_2 = \sqrt{\left[ \frac{2\epsilon_0 - \epsilon_{+\beta} - \epsilon_{-\beta}}{1 - \cos 2\beta} \right]^2 + \left[ \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{\sin 2\alpha_0} \right]^2}$$

$$\epsilon_{1,2} = \frac{\epsilon_{+\beta} + \epsilon_{-\beta} - 2\epsilon_0 \cos 2\beta}{2(1 - \cos 2\beta)} \pm \frac{1}{2} \sqrt{\left[ \frac{2\epsilon_0 - \epsilon_{+\beta} - \epsilon_{-\beta}}{1 - \cos 2\beta} \right]^2 + \left[ \frac{\epsilon_{+\beta} - \epsilon_{-\beta}}{\sin 2\beta} \right]^2}$$

$$1^\circ \quad \beta = 45^\circ \Rightarrow \tan \beta = 1 \Rightarrow \tan 2\alpha_0 = \frac{\epsilon_{+45} - \epsilon_{-45}}{2\epsilon_0 - \epsilon_{+45} - \epsilon_{-45}}$$

$$\cos 2 \times 45 = 0, \sin 2 \times 45 = 1 \Rightarrow \epsilon_{1,2} = \frac{\epsilon_{+45} - \epsilon_{-45}}{2} \pm \frac{1}{2} \sqrt{(2\epsilon_0 - \epsilon_{+45} + \epsilon_{-45})^2 + (\epsilon_{+45} - \epsilon_{-45})^2}$$

$$2^\circ \quad \beta = 60^\circ \Rightarrow \tan 60 = \sqrt{3} \Rightarrow \tan 2\alpha_0 = \frac{\epsilon_{+60} - \epsilon_{-60}}{2\epsilon_0 - \epsilon_{+60} - \epsilon_{-60}} \sqrt{3}$$

$$\cos 2 \times 60 = -\frac{1}{2}, \sin 2 \times 60 = \frac{\sqrt{3}}{2} \Rightarrow \epsilon_{1,2} = \frac{\epsilon_{+60} + \epsilon_{-60} + \epsilon_0}{3} \pm \frac{1}{3} \sqrt{(2\epsilon_0 - \epsilon_{+60} + \epsilon_{-60})^2 + 3(\epsilon_{+60} - \epsilon_{-60})^2}$$