

1. uzdevums

$$m = 5$$

$$\lambda_{\text{šaur.}} = \frac{D_i \cdot d}{a \cdot m} = \frac{(x_{i+m} - x_i) \cdot d}{a \cdot m}$$

$$\lambda_{\text{šaur.}} = \frac{(1,72 \text{ mm} - 0,02 \text{ mm}) \cdot 0,344 \text{ mm}}{23,3 \text{ cm} \cdot 5} \approx 501,97 \text{ nm}$$

2. uzdevums

$$\lambda_{\text{šaur. 1.}} \approx 501,97 \text{ nm}, \lambda_{\text{šaur. 2.}} \approx 504,93 \text{ nm}$$

$$\lambda_{\text{šaur. 3.}} \approx 504,93 \text{ nm}, \lambda_{\text{šaur. 4.}} \approx 504,93 \text{ nm}$$

$$\lambda_{\text{šaur. 5.}} \approx 487,21 \text{ nm}; \bar{\lambda}_{\text{šaur.}} = \frac{1}{5} \sum_{i=1}^5 \lambda_{\text{šaur. i}} \approx 496,07 \text{ nm}$$

$$\begin{aligned} \delta\lambda &= \sqrt{\left(\frac{\partial\lambda}{\partial D} \cdot \Delta D\right)^2 + \left(\frac{\partial\lambda}{\partial d} \cdot \Delta d\right)^2 + \left(\frac{\partial\lambda}{\partial a} \cdot \Delta a\right)^2} = \\ &= \sqrt{\left(\frac{d}{a \cdot m} \cdot \Delta D\right)^2 + \left(-\frac{D \cdot d}{a^2 \cdot m} \cdot \Delta a\right)^2} = \\ &= \sqrt{0,00000295279^2 + 0,000002154^2} = 3,65 \text{ nm} \end{aligned}$$

3. uzdevums

$$D_{\text{plat.}} = \frac{a}{d_{\text{plat.}}} \cdot m \cdot \lambda_{\text{šaur.}} = \frac{233 \text{ mm}}{0,836 \text{ mm}} \cdot 6 \cdot 502 \text{ nm} = 0,839 \text{ mm}$$

$$D'_{\text{plat.}} = 1,72 - 0,81 = 0,91 \text{ mm}$$

4. uzdevums

$\delta a = 0,5 \text{ mm}$, jo tas ir puse no instrumenta mazākās iedaļas vērtības.

$\delta D = 0,005 \text{ mm}$, jo tas ir puse no instrumenta mazākās iedaļas vērtības.

$$\delta\lambda = \sqrt{\left(\frac{\partial\lambda}{\partial D} \cdot \Delta D\right)^2 + \left(\frac{\partial\lambda}{\partial d} \cdot \Delta d\right)^2 + \left(\frac{\partial\lambda}{\partial a} \cdot \Delta a\right)^2} = 3,65 \text{ nm}$$

$$\varepsilon_\lambda = \frac{3,65}{496,07} \approx 0,74\%$$

$$\lambda = (496,07 \pm 3,65) \text{ nm pie } \beta = 0,95 \text{ un } \varepsilon_\lambda = 0,74\%$$