

# 1 Extrémne dĺžkové skreslenia III

Vypočítajte parametre Tissotovej indikatrix v zobrazení danom rovnicami:

$$\begin{aligned} X &= R \operatorname{tg} \left( \frac{\varphi}{2} + 45^\circ \right) \cos \lambda \\ Y &= R \operatorname{tg} \left( \frac{\varphi}{2} + 45^\circ \right) \sin \lambda \end{aligned}$$

v bode  $P = [52^\circ \text{ s.s.}, 99^\circ \text{ z.d.}]$

*Riešenie* Dané zobrazenie patrí do skupiny azimutálnych zobrazení:

$$\begin{aligned} X &= \rho(\varphi) \cos \epsilon(\lambda) \\ Y &= \rho(\varphi) \sin \epsilon(\lambda) \end{aligned}$$

Preto platí:

$$\begin{aligned} F = 0 &\implies A_a = 0^\circ \wedge A_b = 90^\circ \\ m_a &= m_p = \frac{\sqrt{E}}{R} \\ m_b &= m_r = \frac{\sqrt{G}}{R \cos \varphi} \end{aligned}$$

Vypočítame potrebné parciálne derivácie zobrazovacích funkcií:

$$\begin{aligned} \frac{\partial x}{\partial \varphi} &= \frac{R \cos \lambda}{2 \cos^2 \left( \frac{\varphi}{2} + 45^\circ \right)} & \frac{\partial x}{\partial \lambda} &= -R \operatorname{tg} \left( \frac{\varphi}{2} + 45^\circ \right) \sin \lambda \\ \frac{\partial y}{\partial \varphi} &= \frac{R \sin \lambda}{2 \cos^2 \left( \frac{\varphi}{2} + 45^\circ \right)} & \frac{\partial y}{\partial \lambda} &= R \operatorname{tg} \left( \frac{\varphi}{2} + 45^\circ \right) \cos \lambda \end{aligned}$$

$$\begin{aligned} m_a &= \frac{\sqrt{E}}{R} = \frac{\sqrt{\frac{R^2}{2^2 \cos^4 \left( \frac{\varphi}{2} + 45^\circ \right)}}}{R} = \frac{1}{2 \cos^2 \left( \frac{\varphi}{2} + 45^\circ \right)} \\ m_b &= \frac{\sqrt{G}}{R \cos \varphi} = \frac{\sqrt{R^2 \operatorname{tg}^2 \left( \frac{\varphi}{2} + 45^\circ \right)}}{R \cos \varphi} = \frac{\operatorname{tg} \left( \frac{\varphi}{2} + 45^\circ \right)}{\cos \varphi} = \\ &= \frac{\operatorname{tg} \left( \frac{\varphi}{2} + 45^\circ \right)}{2 \sin \left( \frac{\varphi}{2} + 45^\circ \right) \cos \left( \frac{\varphi}{2} + 45^\circ \right)} = \frac{1}{2 \cos^2 \left( \frac{\varphi}{2} + 45^\circ \right)} = m_a \end{aligned}$$

Po dosadení súradníc zadaného bodu:

$$m_a = m_b = \frac{1}{2 \cos^2 \left( \frac{52^\circ}{2} + 45^\circ \right)} = 4,71722$$

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