Výpočet délky lana řetězovky:

$$s_{OB} = \int_O^B ds = \int_0^{x_B} \sqrt{1+y'^2}\, dx = \int_0^{x_B} \sqrt{1+\frac{p^2x^2}{T_O^2}}\, dx$$

$$= \frac{1}{2}\left[x_B\sqrt{1+\frac{p^2x_B^2}{T_O^2}} + \frac{T_O}{p}\ln\left(\frac{px_B}{T_O} + \sqrt{1+\frac{p^2x_B^2}{T_O^2}}\right)\right]$$

Délka s_{OA} se vypočítá analogicky a celková délka je pak jejich součtem

$$s = s_{OA} + s_{OB}$$

$$\int_0^{x_B}\left(1+\frac{p^2x^2}{T_0^2}\right)^{\frac{1}{2}}dx = \frac{p}{T_0}\int_0^{x_B}\left(\frac{T_0^2}{p^2}+x^2\right)^{\frac{1}{2}}dx = \left[\frac{p}{T_0}\cdot\frac{1}{2}\left(x\sqrt{x^2+\frac{T_0^2}{p^2}} + \frac{T_0^2}{p^2}\operatorname{argsinh}\frac{x\cdot p}{T_0}\right)\right]_0^{x_B} =$$

$$\left(\int\left(x^2+a^2\right)^{\frac{1}{2}}dx = \frac{1}{2}\left(x\sqrt{x^2+a^2} + a^2\operatorname{argsinh}\frac{x}{a}\right)\right)$$

$$= \left[\frac{1}{2}\left(x\sqrt{\frac{p^2}{T_0^2}x^2+1} + \frac{T_0}{p}\operatorname{argsinh}\frac{x\cdot p}{T_0}\right]_0^{x_B} = \left[\frac{1}{2}\left(x\sqrt{1+\frac{p^2}{T_0^2}x^2} + \frac{T_0}{p}\ln\left(\frac{x\cdot p}{T_0}+\sqrt{\frac{x^2p^2}{T_0^2}+1}\right)\right)\right]_0^{x_B} =$$

$$\left(\operatorname{argsinh}(x) = \ln\left(x+\sqrt{x^2+1}\right)\right)$$

$$= \frac{1}{2}\left[x_B\sqrt{1+\frac{p^2}{T_0^2}x_B^2} + \frac{T_0}{p}\ln\left(\frac{x_B\cdot p}{T_0}+\sqrt{\frac{x_B^2\cdot p^2}{T_0^2}+1}\right)\right] - \emptyset$$