

TMKS0700 STATIIKKA JA LUJUUSOPPI

Tehtävä L4-7

Miten suuri teho voidaan siirtää teräsakselilla kun:

$$\begin{aligned}\varphi/L &= 0,2 \text{ }^\circ/\text{m} & 3,49066\text{E-06} \\ n &= 1450 \text{ r/min} & 24,16666667 \\ d &= 60 \text{ mm} \\ \tau_{\text{sall}} &= 100 \text{ MPa} \\ E &= 210 \text{ GPa} \\ \nu &= 0,33\end{aligned}$$

$$G = E/(2(1+\nu)) = 78,9 \text{ GPa}$$

$$P = 2T\pi n$$

$$\varphi = TL/(GI_v) \implies GI_v\varphi/L = T$$

$$I_v = \pi d^4/32 = 1272345 \text{ mm}^4$$

$$T = 350,631 \text{ Nm}$$

$$\tau = T/W_v \implies T = \tau W_v$$

$$W_v = \pi d^3/16 = 42411,50 \text{ mm}^3$$

$$T = 4241,1501 \text{ Nm}$$

$$P = 53,2 \text{ kW}$$