

Найдём M_1 из расчёта $\max \tau \leq [\tau]$

$$\tau_{21} = \frac{M_{21}}{W_{p21}} = \frac{0,03918}{W_{p21}} = 7390,4486 \text{ Н/м}^2$$

$$W_{p21} = \frac{\pi d_2^3}{16} = 5,3044 \cdot 10^{-6}$$

$$W_{32} = W_{21}$$

$$W_{43} = \frac{\pi d_3^3}{16} (1 - C^4) = \frac{\pi d_3^3}{16} \left(1 - \left(\frac{d_1}{d_3} \right)^4 \right) = 1,04355 \cdot 10^{-5}$$

$$\tau_{32} = \frac{M_{32}}{W_{32}} = 19608,4427 \text{ Н/м}^2$$

$$\tau_{43} = \frac{M_{43}}{W_{43}} = 369865,54596 \text{ Н/м}^2$$

$$\max \tau = [\tau] \Rightarrow M_1 = \frac{[\tau]}{\tau_{43}} \approx 270,4 \text{ Н·м}$$

Найдём углы поворота

$$\varphi_4 = 0; \varphi_3 = \varphi_4 + \frac{M_{43} l_3}{G J_{43}} = -0,0971243 \text{ рад}$$

$$\varphi_2 = \varphi_3 + \frac{M_{32} l_2}{G J_{32}} \approx -0,030873 \text{ рад}$$

$$\varphi_1 = \varphi_2 + \frac{M_{21} l_1}{G J_{21}} \approx 0,00000976 \approx 0$$

Эпюры углов поворота сечений

