ME 360 21.10.08

torsion springs

$$N_e = \frac{L_1 + L_2}{3\pi D}$$ effective due to end Eq 14.27a

$$N_a = N_b + N_e$$ N_b # in body

$$k_\theta = \frac{d^4 E}{10.8\, D N_a}$$ Eq 14.29

units $\frac{in \cdot lbf}{rev}$ $\frac{N \cdot mm}{rev}$

bending

$$\sigma_{MAX} = K_{bi} \frac{32 M}{\pi d^3}$$ Eq 14.33a

inner

$$K_{bi} = \frac{4C^2 - C - 1}{4C(C-1)}$$ Eq 14.32a

$C = D/d$ spring index

$$S_{UT} = A d^b$$ Eq 14.3

A and b Table 14-4

$S_y = 0.8\, S_{UT}$ A227, A228

$= 0.85\, S_{UT}$ A229, A230, A232, A401

Table 14-15