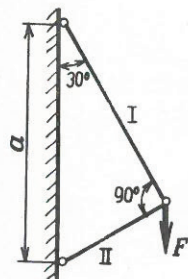


Úlohy 25 až 40

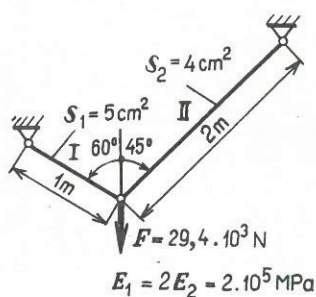
Určete posuvy δ působíšť vnějších sil F (nebo bodů stanovených v zadání) a normální napětí v příčných řezech pružných prutů.

V úlohách obecně zadaných, kde nejsou hodnoty E a S , předpokládejte je za dané a stejné pro všechny pružné elementy soustavy. V úlohách 37 až 40 $E = 2 \cdot 10^5$ MPa, v úlohách 35 a 36 $E = 1,96 \cdot 10^5$ MPa.

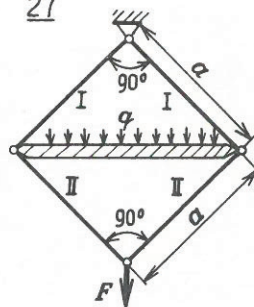
25



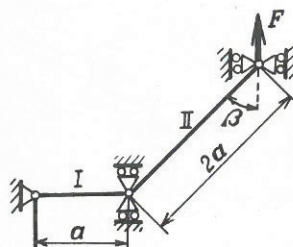
26



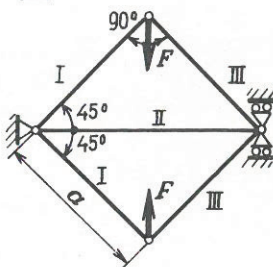
27



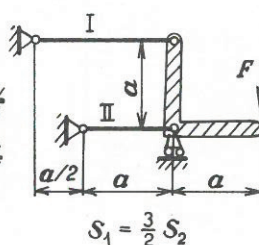
28



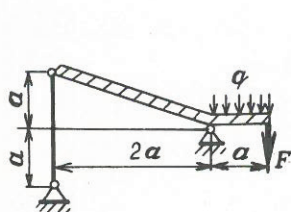
29



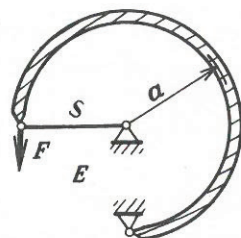
30



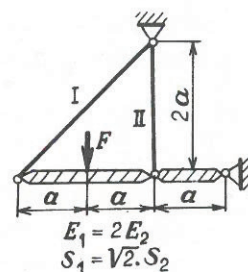
31



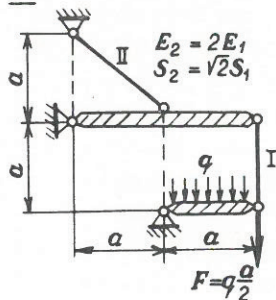
32



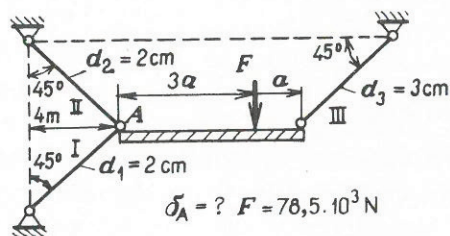
33



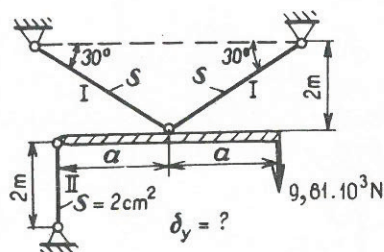
34



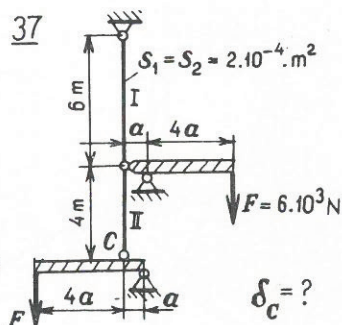
35



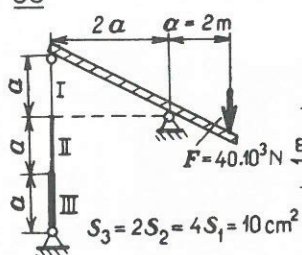
36



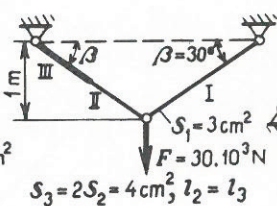
37



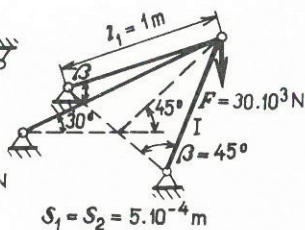
38



39



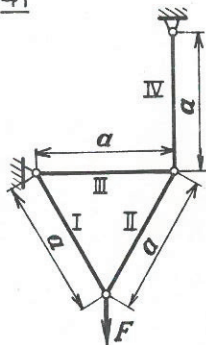
40



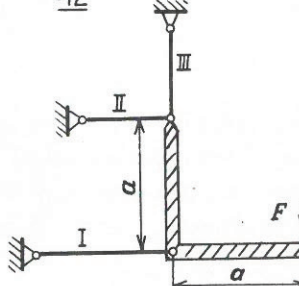
Úlohy 41 až 48

Určete rozměry ploch S příčných řezů pružných částí soustav. V úlohách obecně zadaných považujte dovolené napětí stejné v tahu i tlaku pro všechny pružné části soustavy. Jestliže v zadání není modul pružnosti E zadán, předpokládejte ho známý a stejný pro všechny pruty. V úlohách 45 až 46 pro ocel je $E = 1,96 \cdot 10^5$ MPa.

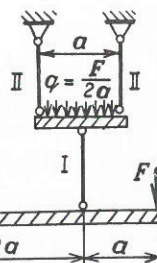
41



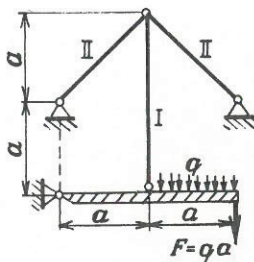
42



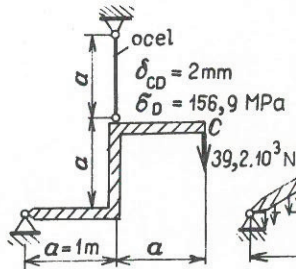
43



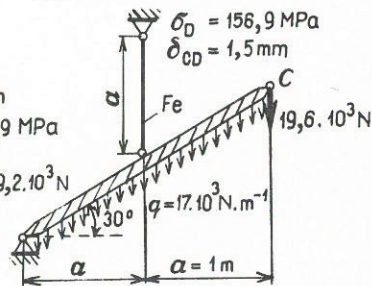
44



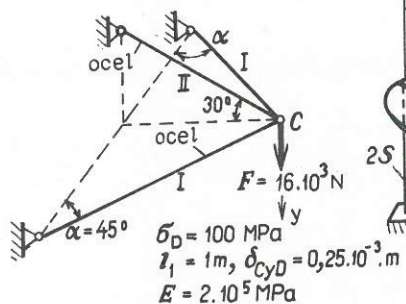
45



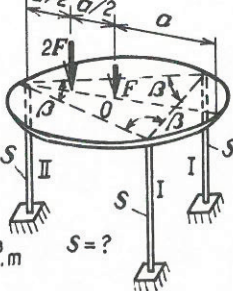
46



47

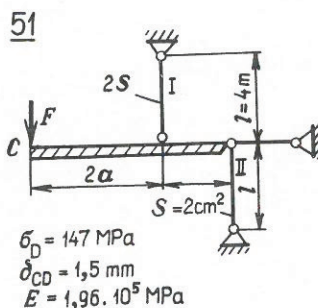
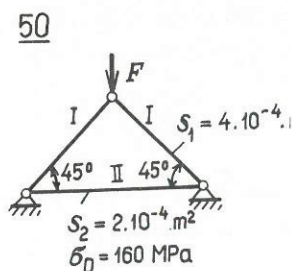
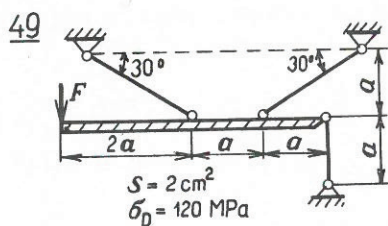


48



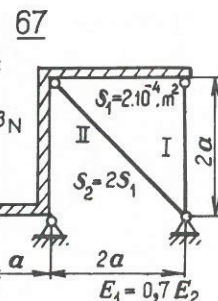
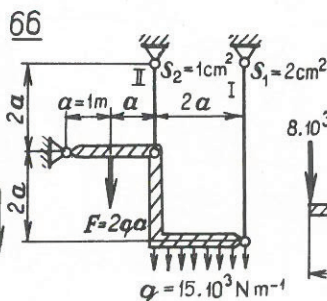
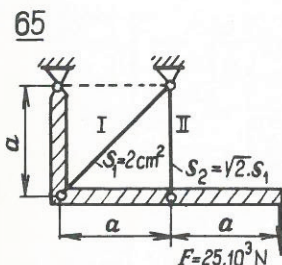
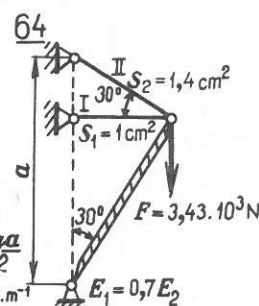
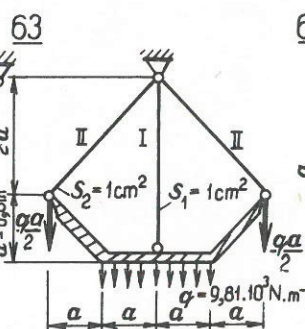
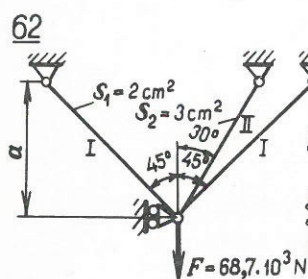
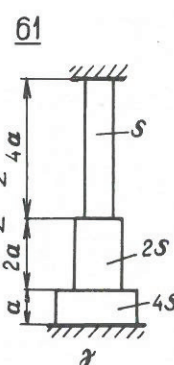
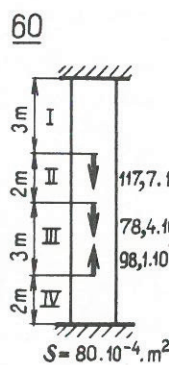
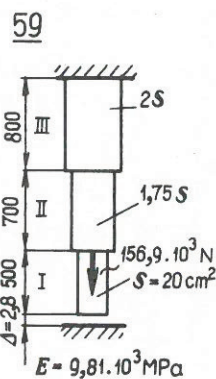
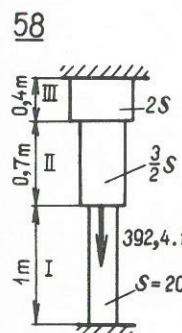
Úlohy 49 až 53

Určete dovolenou sílu F nebo veličiny udané v zadáních.

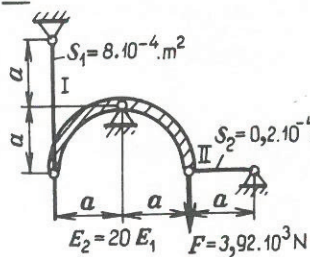


Úlohy 58 až 70

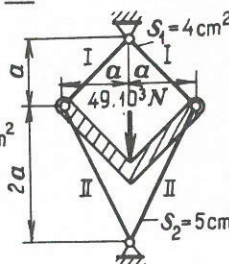
Určete normální napětí v pružných částech soustav od působících sil. Jestliže v zadání není modul pružnosti v tahu E dán, uvažujte ho stejný pro všechny pružné části soustavy.



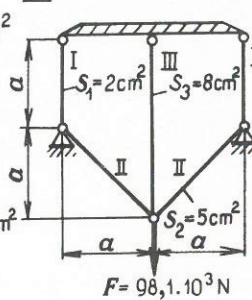
68



69



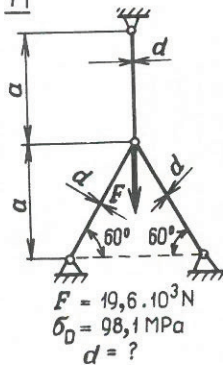
70



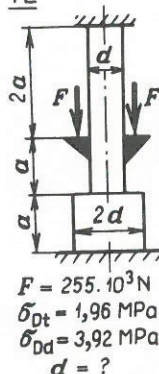
Úlohy 71 až 73

Stanovte rozměry příčných řezů jednotlivých částí soustavy.

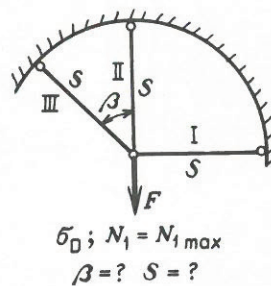
71



72



73

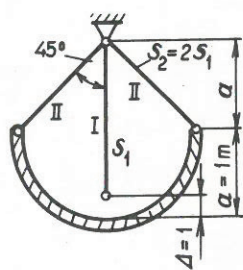


Úlohy 74 až 79

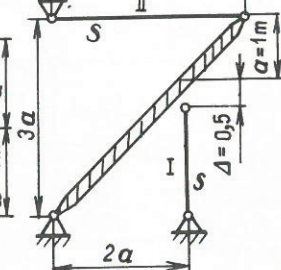
Určete montážní napětí.

Δ – délková velikost výrobní nepřesnosti pružné části soustavy. U prutů je $E = 1,96 \cdot 10^5$ MPa, v úlohách 78, 79 $E = 2 \cdot 10^5$ MPa.

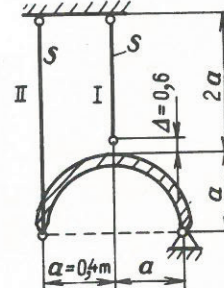
74



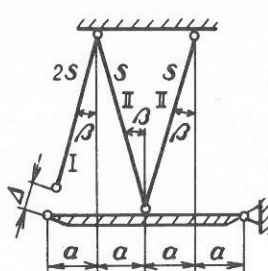
75



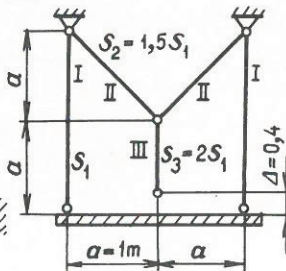
76



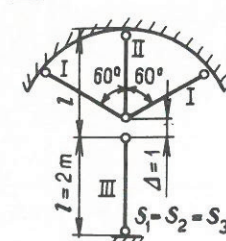
77



78



79



Úlohy 80 až 87

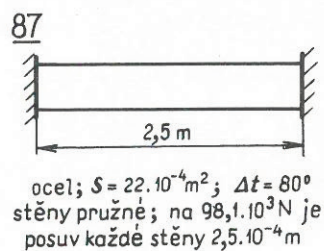
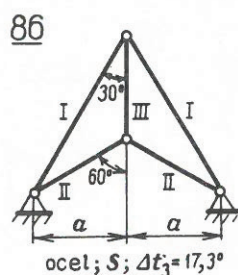
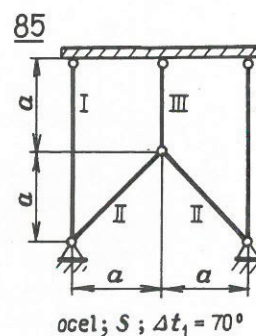
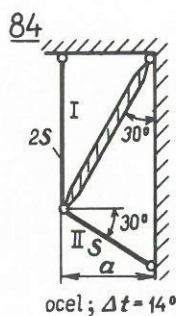
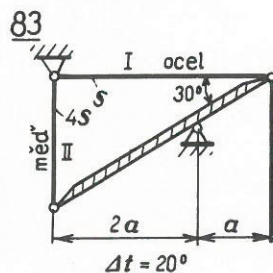
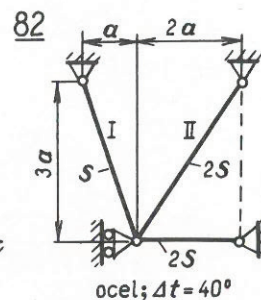
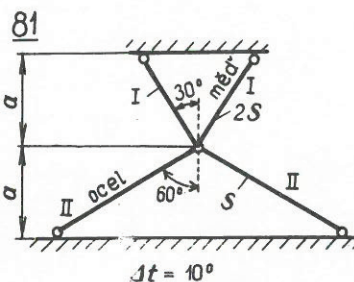
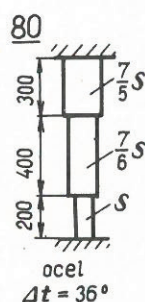
Určete napětí, vzniklé vlivem teploty.

Označení: Δt – změna teploty ve stupních Celsia celé soustavy,
 Δt_i – změna teploty ve stupních Celsia i -té části soustavy,
 o – ocel,
 m – měď.

Dáno: pro ocel $E = 1,96 \cdot 10^5$ MPa; $\alpha = 1,25 \cdot 10^{-5}$;

pro měď $E = 9,81 \cdot 10^4$ MPa; $\alpha = 1,65 \cdot 10^{-5}$.

V úlohách 84, 86, 87 je pro ocel $E = 2 \cdot 10^5$ MPa.

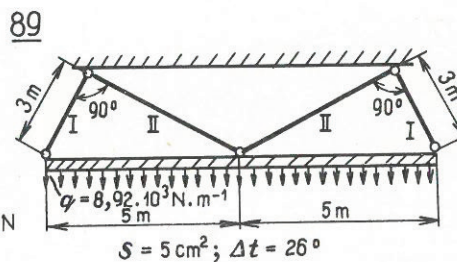
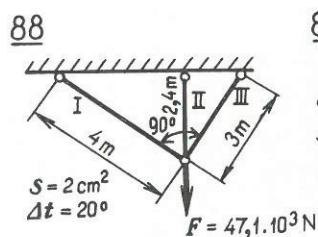


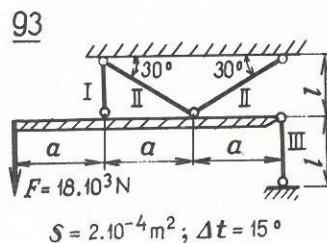
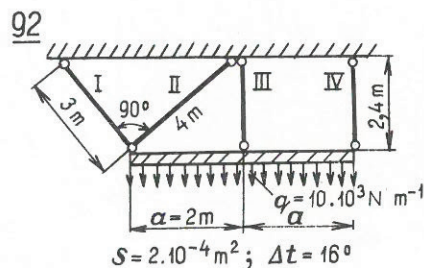
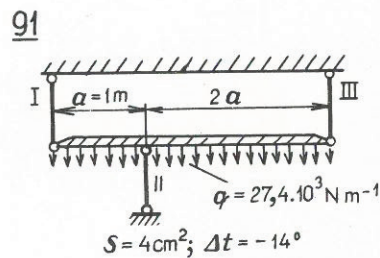
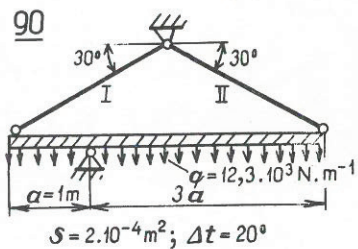
Úlohy 88 až 93

Určete napětí od působících sil a napětí od změny teploty.

Označení: σ_{ip} , σ_{it} – napětí v i -tém prutu odpovídající působení sil a změně teploty.

V úlohách 92, 93 je $E = 2 \cdot 10^5$ MPa.



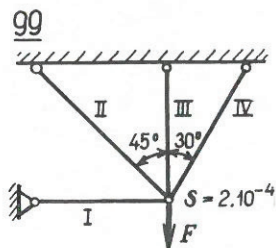
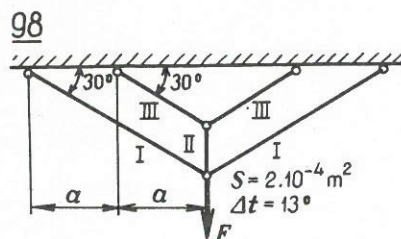
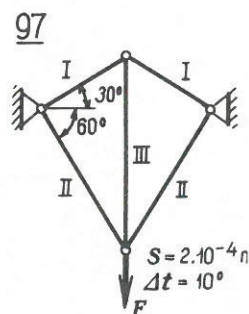
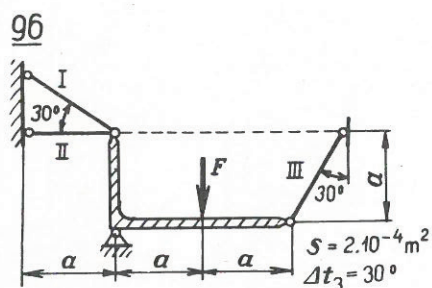
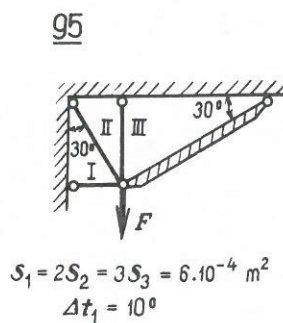
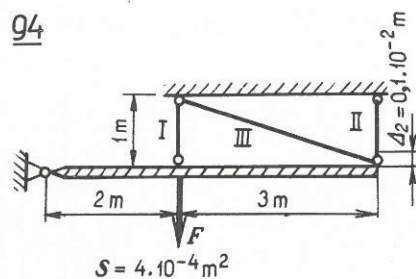


Úlohy 94 až 101

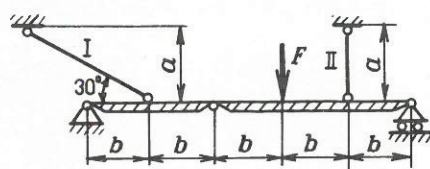
Určete dovolené (přípustné) síly výpočtem na dovolené napětí (F) a na únosnost (F') a rovněž určete montážní napětí σ_{im} a napětí vlivem t v souladu se zadanými veličinami uvedenými ve schématu.

Pro pruty platí: $\sigma_D = 157 \text{ MPa}$; $E = 1,96 \cdot 10^5 \text{ MPa}$; $\alpha = 1,2 \cdot 10^{-5}$.

V úlohách 99, 101 $\sigma_D = 160 \text{ MPa}$; $E = 2 \cdot 10^5 \text{ MPa}$.

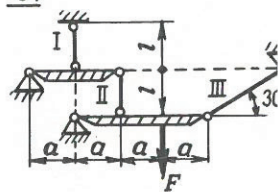


100



$$S = 2 \cdot 10^{-4} \text{ m}^2; \Delta t_1 = 16^\circ$$

101



$$S = 2 \cdot 10^{-4} \text{ m}^2; \Delta t_1 = 10^\circ$$