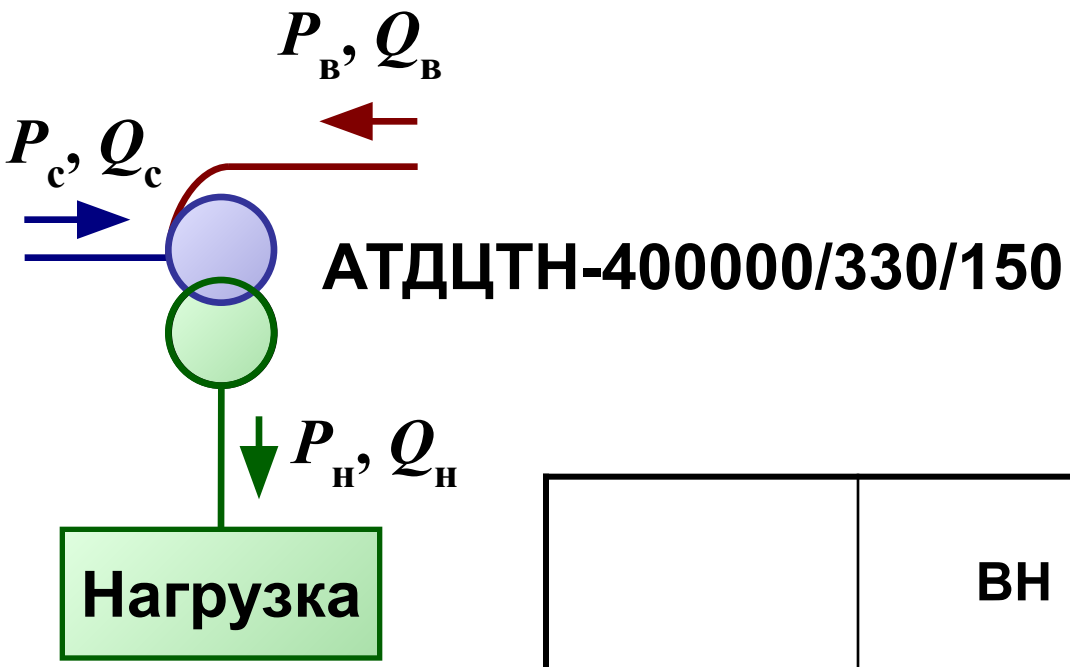
Может ли автотрансформатор работать в заданных режимах?



$$P_н = P_в + P_с$$

$$P_в = P_н - P_с$$

	ВН	СН	НН
1	-120 МВт -50 Мвар	270 МВт 100 Мвар	150 МВт 50 Мвар
2	350 МВт 120 Мвар	–140 МВт –40 Мвар	210 МВт 80 Мвар

Параметры автотрансформатора

АТДЦТН-400000/330/150

$$U_{\text{с}} = 150\ \text{кВ}$$

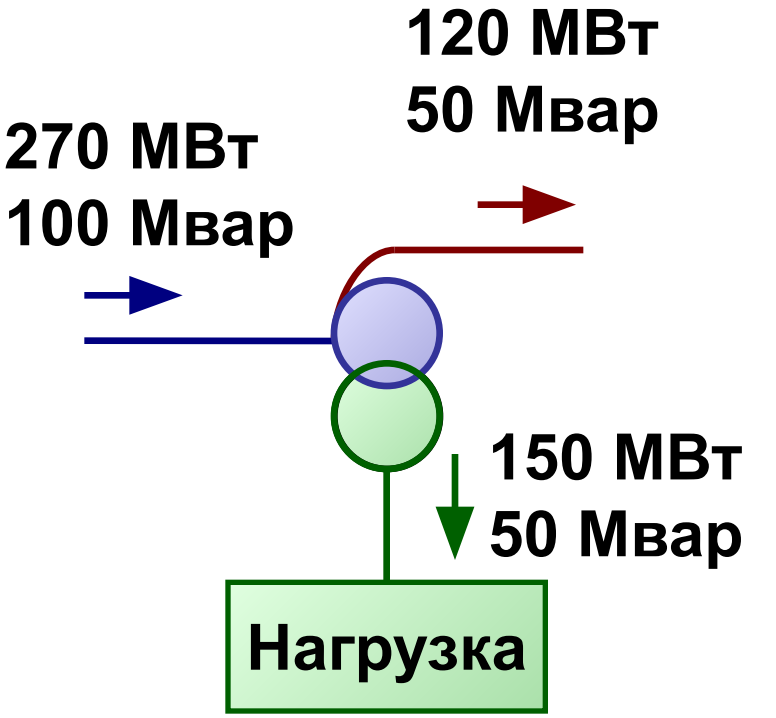
$$U_{\text{в}} = 330\ \text{кВ}$$

$$S_{\text{ном}} = 400000\ \text{кВА} = 400\ \text{МВ} \cdot \text{А}$$

$$k_{\text{тип}} = \frac{U_{\text{в}} - U_{\text{с}}}{U_{\text{в}}} = \frac{330 - 150}{330} = 0.545$$

$$S_{\text{тип}} = k_{\text{тип}} S_{\text{ном}} = 0{,}545 \cdot 400 = 218{,}2\ \text{МВ} \cdot \text{А}$$

Режим 1



$$S_{\text{н}} = \sqrt{150^2 + 50^2} = 158{,}1\ \text{МВ} \cdot \text{А}$$

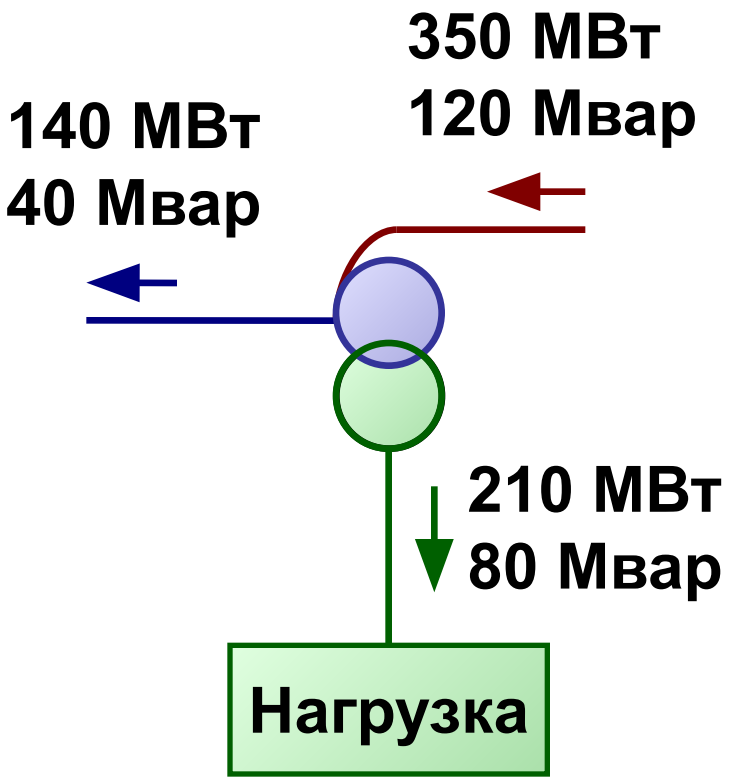
$$S_{\text{н}} < S_{\text{тип}} = 218{,}2\ \text{МВ} \cdot \text{А}$$

$$S_{\text{о}} = \sqrt{(k_{\text{тип}} P_{\text{в}} + P_{\text{н}})^2 + (k_{\text{тип}} Q_{\text{в}} + Q_{\text{н}})^2} =$$

$$= \sqrt{(0{,}545 \cdot 120 + 150)^2 + (0{,}545 \cdot 50 + 50)^2} = 228{,}8\ \text{МВ} \cdot \text{А}$$

$$\boxed{S_{\text{о}} > S_{\text{тип}}}$$

Режим 2



$$S_{н} = \sqrt{210^2 + 80^2} = 224{,}7\ \text{МВ} \cdot \text{А}$$

$$\boxed{S_{н} > S_{тип} = 218{,}2\ \text{МВ} \cdot \text{А}}$$

$$S_{в} = \sqrt{350^2 + 120^2} = 370{,}0\ \text{МВ} \cdot \text{А}$$

$$S_{в} < S_{ном} = 400\ \text{МВ} \cdot \text{А}$$