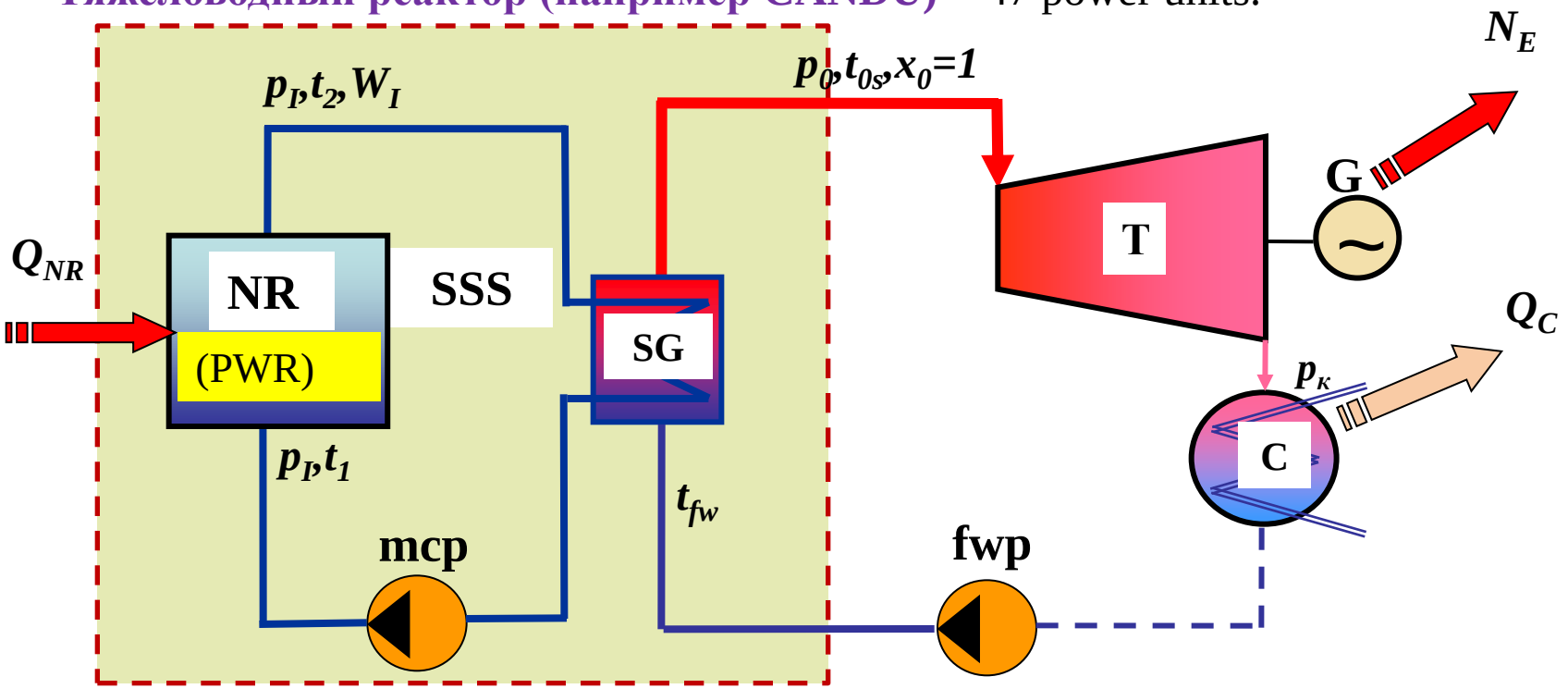
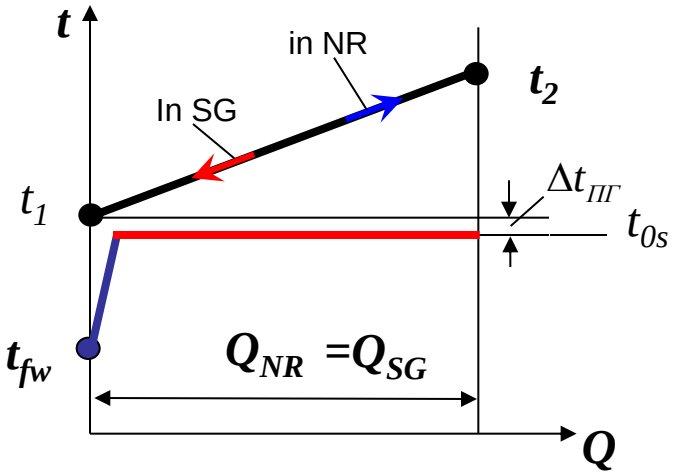
b) Double circuit NPP

WWER (PWR) – pressurized water reactor ~150 power units.

Тяжеловодный реактор (например CANDU) 47 power units.





$$t_{кр} = 375^\circ C, \quad p_{кр} = 22{,}5 МПа$$

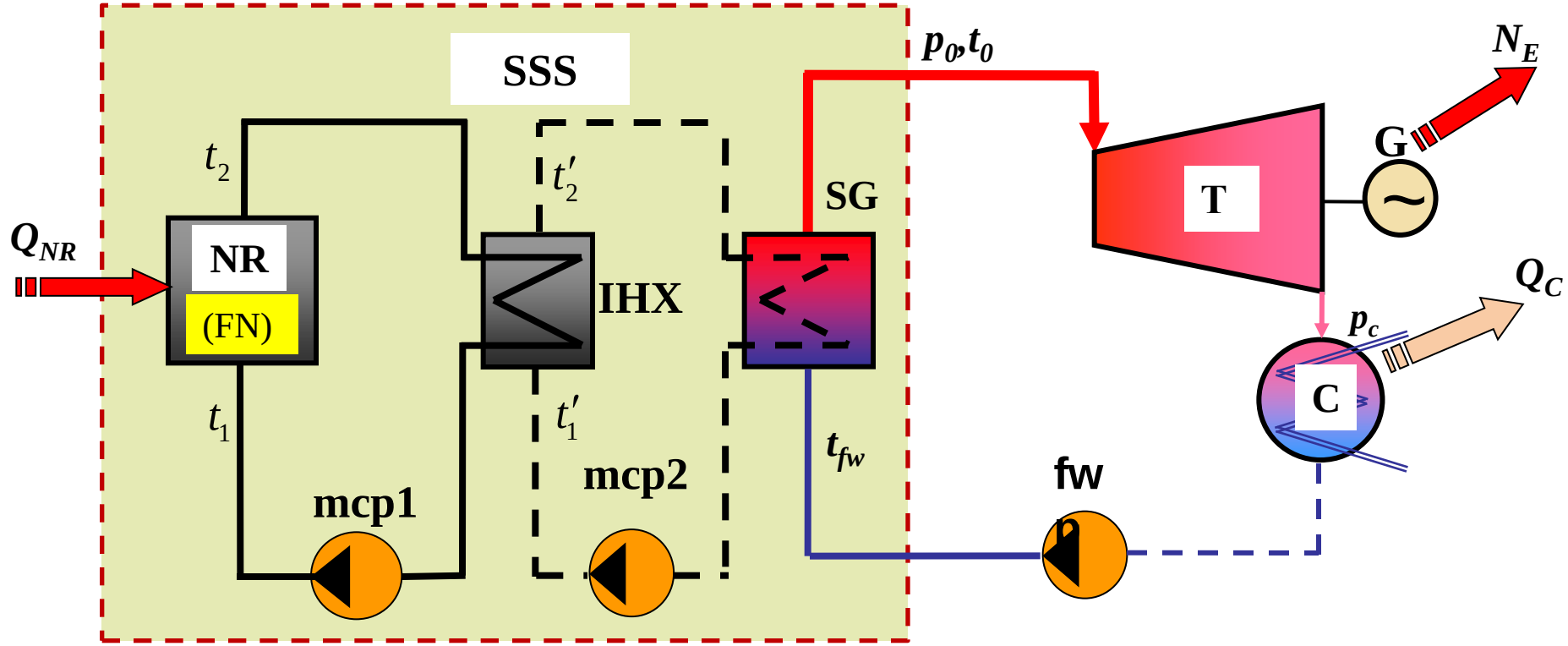
$$p_I = 17 МПа \quad t_2 = 340^\circ C$$

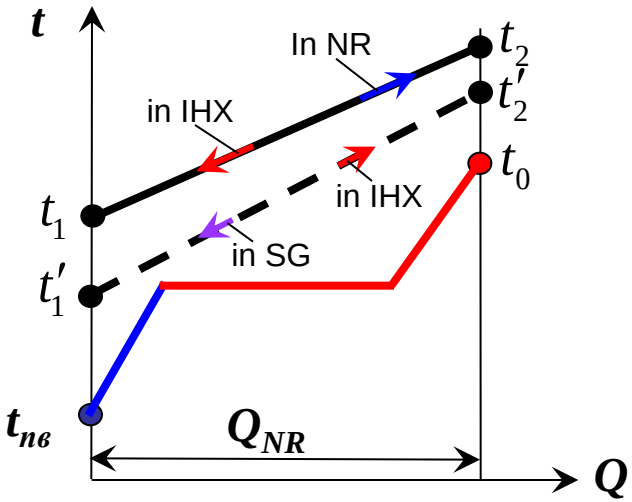
$$W_I = \frac{Q_{ЯР}}{c_p\left(t_2 - t_1\right)} \Rightarrow t_1 \approx 300^\circ C$$

$$t_{0s} = t_1 - \Delta t_{ПГ} \approx 275^\circ C \Rightarrow p_0 = 6{,}0 МПа$$

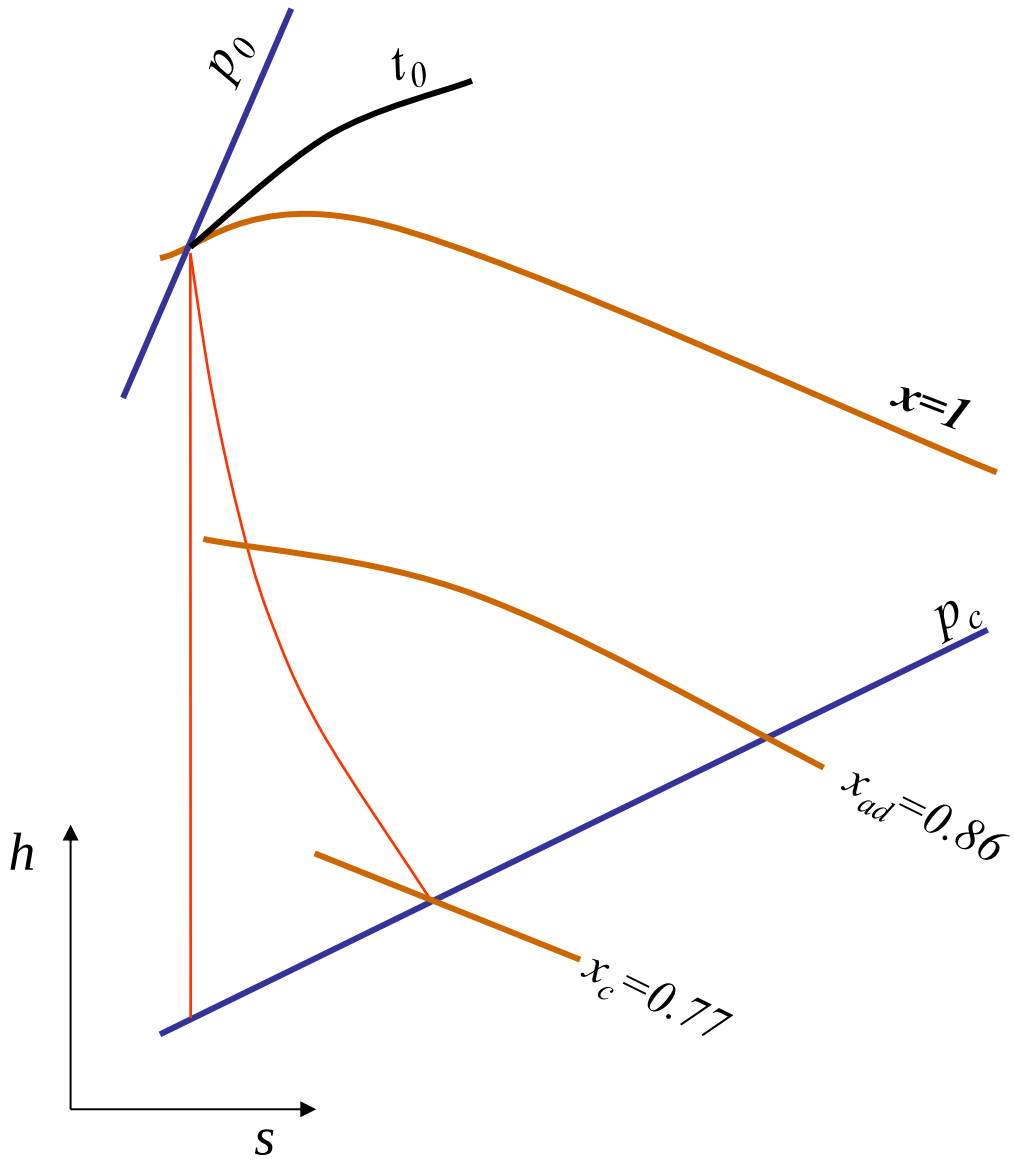
в) Three circuit NPP

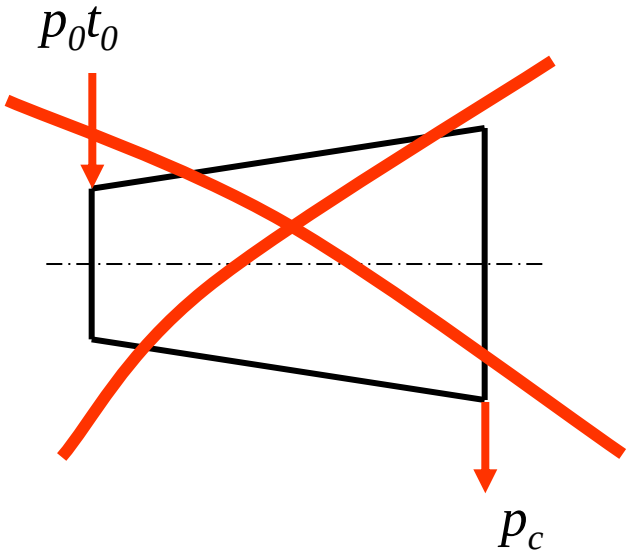
FNR – fast neutron reactor *(sodium-cooled fast reactor)*

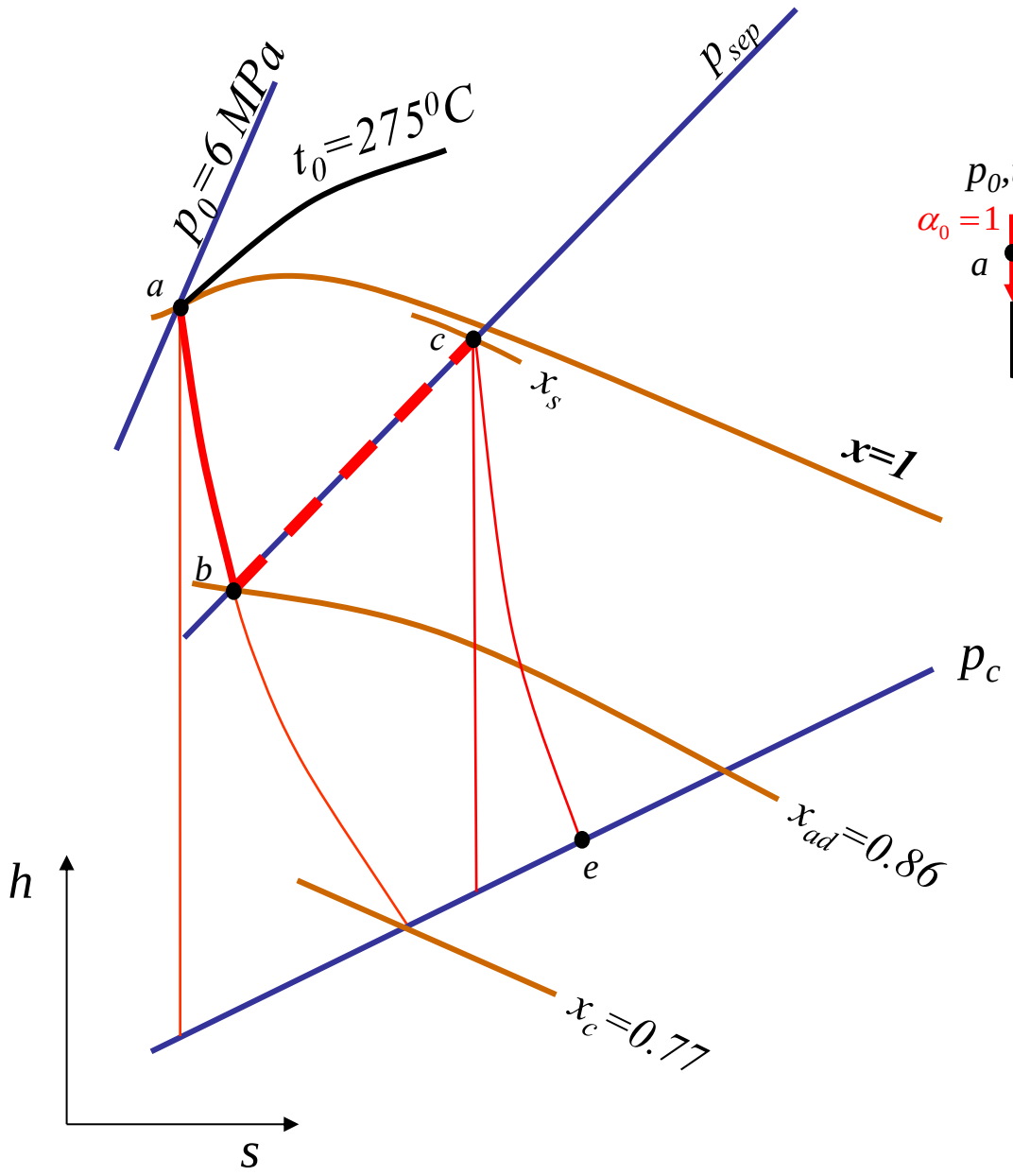


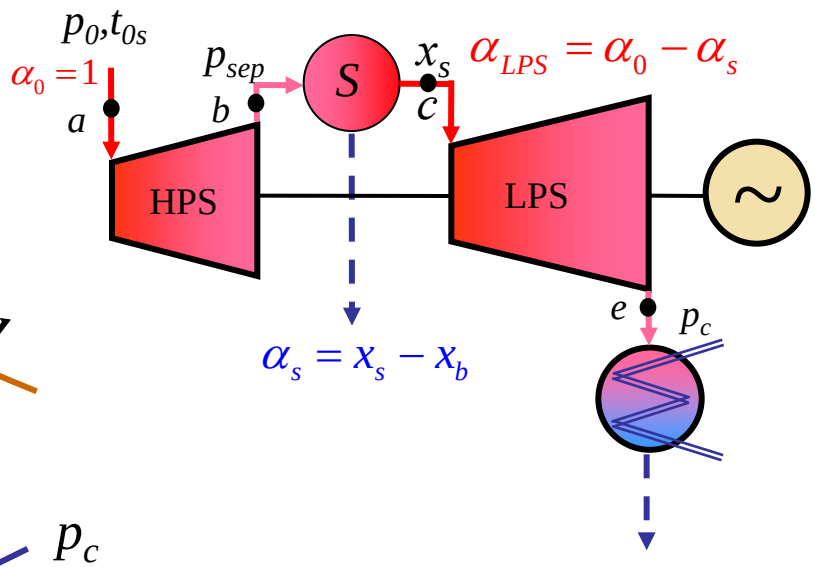


3.2. Steam separation and reheating in NPP cycles









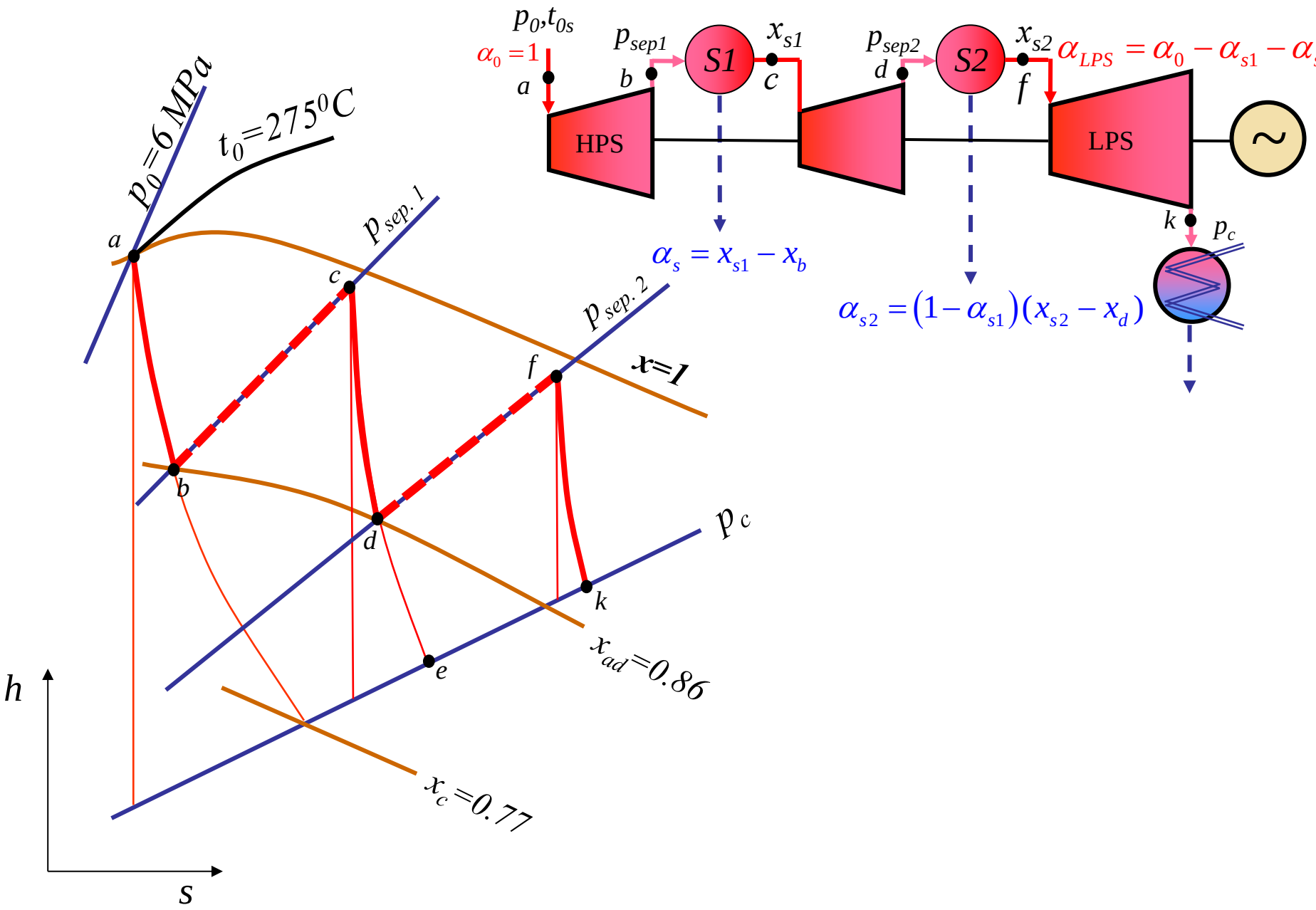
Separation factor:

$$\gamma = \frac{\Delta y}{y_0} = \frac{x_s - x_b}{1 - x_b}$$

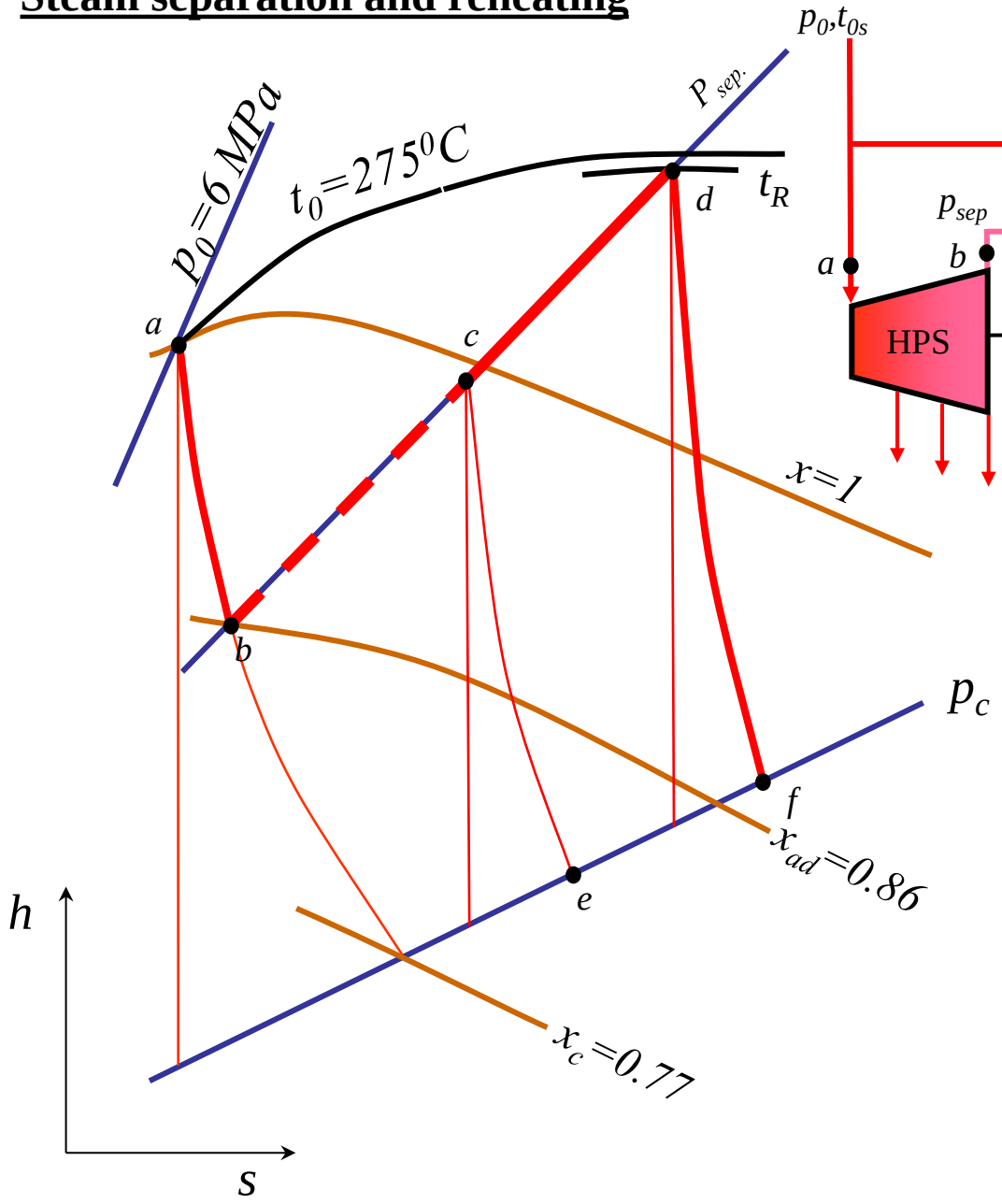
$$\gamma = (0{,}94 - 0{,}98)$$

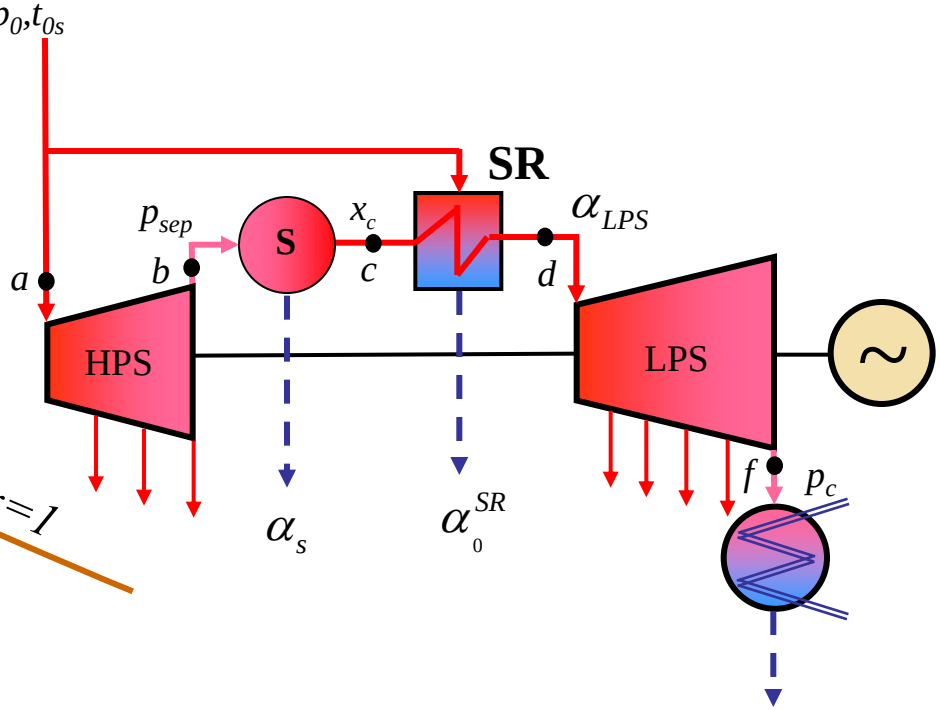
$$x_s = x_b + (1 - x_b)\gamma$$

Duble separation



Steam separation and reheating

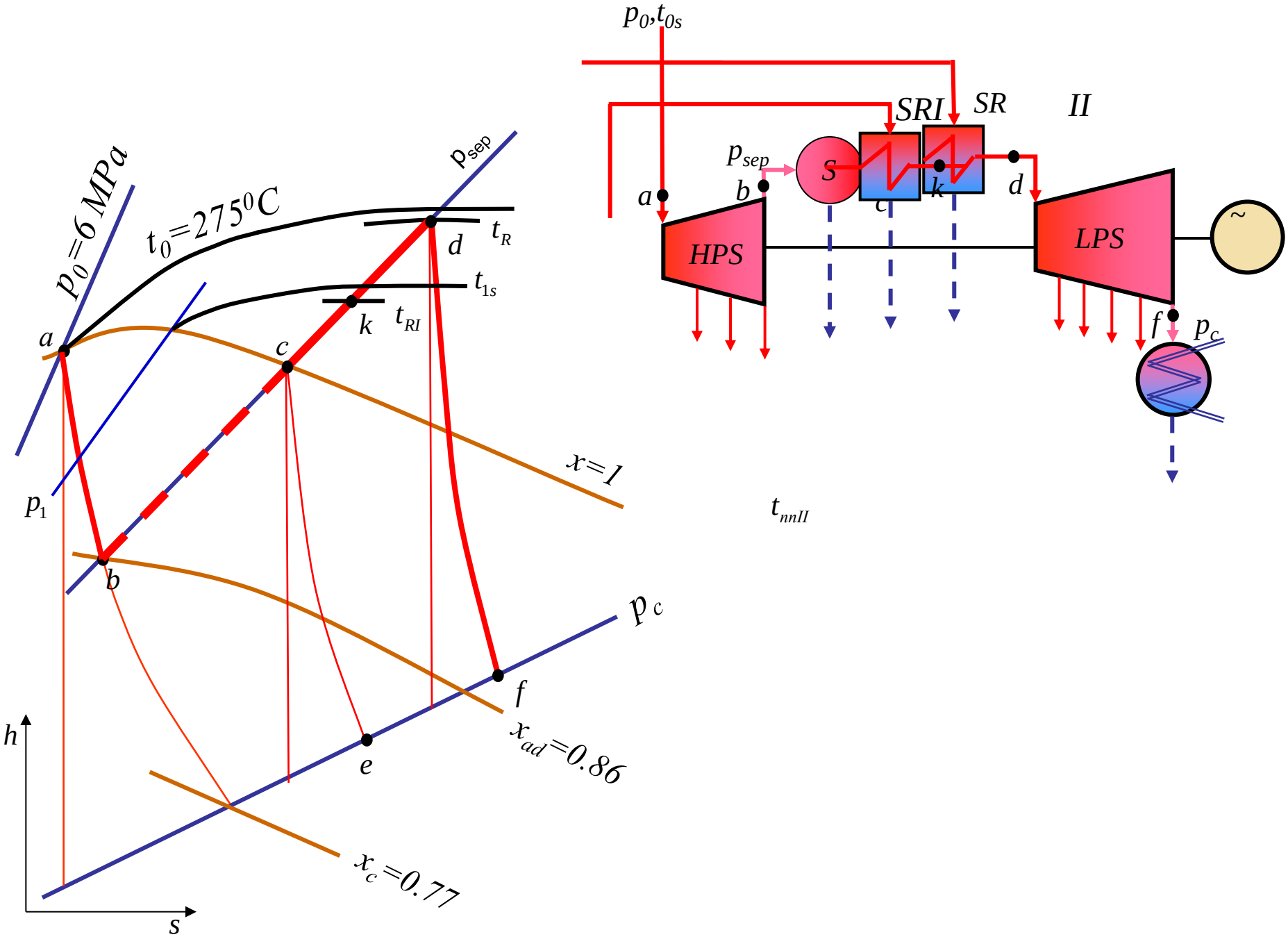




$$\alpha_s = (1-\alpha_1-\alpha_2-\alpha_3)(x_s - x_b)$$

$$\alpha_{LPS} = (1-\alpha_1-\alpha_2-\alpha_3)-\alpha_s$$

$$\alpha_0^{SR} = \frac{(1-\alpha_1-\alpha_2-\alpha_3-\alpha_s)(h_d - h_c)}{(h_0 - h_0')}$$


p_0=6 MPa
t_0=275^{0}C
p_{sep}
t_R
t_{1s}
t_{RI}
a
b
c
d
e
f
k
p_1
p_c
x=1
x_{ad}=0.86
x_c=0.77
h
s
p_0,t_{0s}
SRI
SR
II
p_{sep}
S
HPS
LPS
~
t_{nnII}

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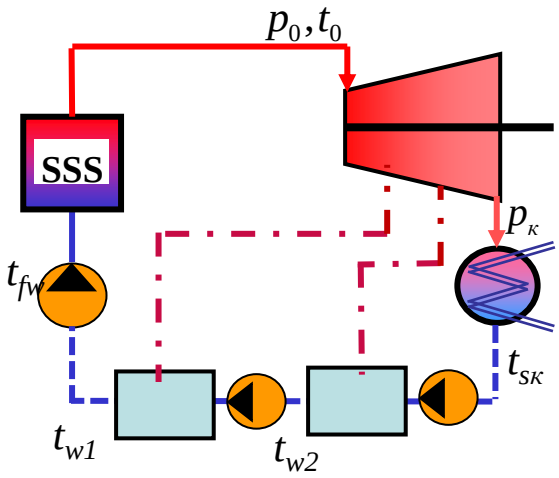

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