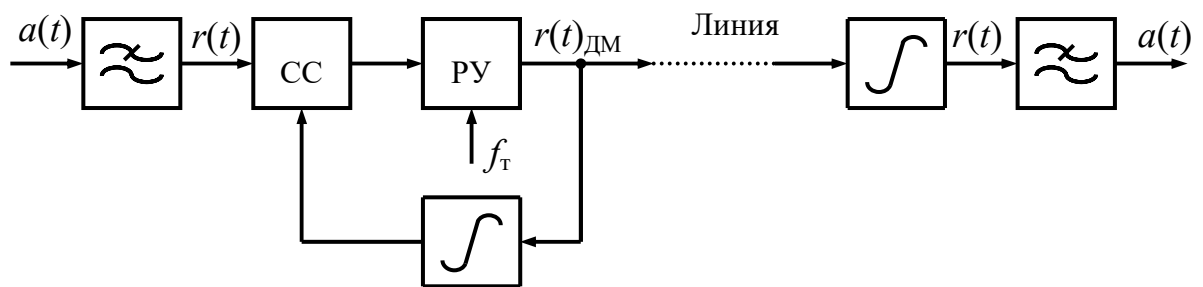
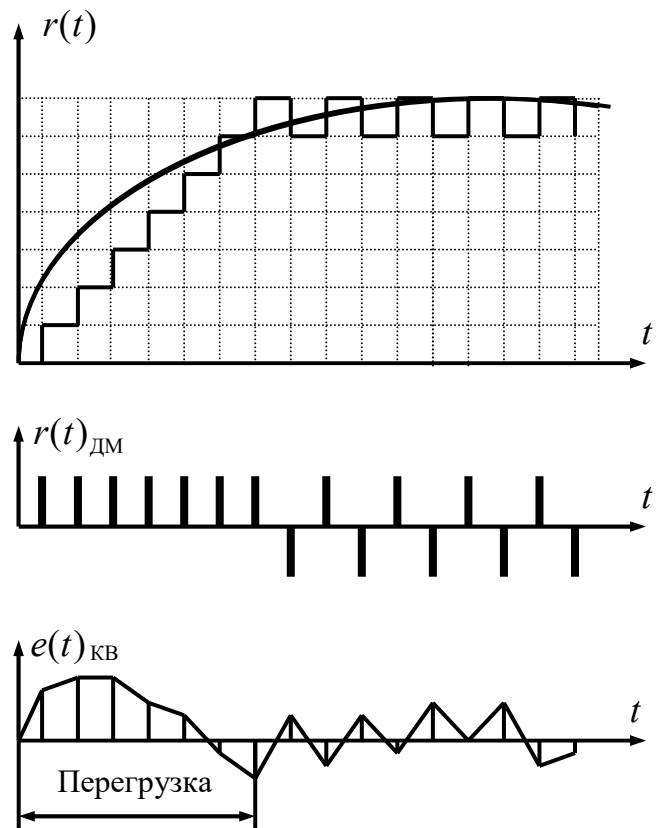


Дельта-модуляция



$$A_{з\text{ KB}} = 10 \lg \frac{P_c}{\sigma_{KB}^2}$$

$$P_c = \frac{U_c^2}{2}$$

$$\sigma_{KB}^2 = \frac{\Delta^2}{12} \cdot \frac{f_\phi}{0,5 \cdot f_d}$$

$$A_{3\text{кВ}} = 10 \lg \frac{U_c^2 6 f_{\Delta}}{\Delta^2 f_{\phi}}$$

$$a'(t) \leq \Delta \cdot f_{\Delta}$$

$$\Delta \geq \frac{a'(t)}{f_{\Delta}}$$

$$a(t) = U_m \cdot \sin(2 \cdot \pi \cdot f_c \cdot t)$$

$$a'(t) = U_m \cdot (\cos(2 \cdot \pi \cdot f_c \cdot t)) \cdot 2 \cdot \pi \cdot f_c$$

$$a'_{\max}(t) = U_m \cdot 2 \cdot \pi \cdot f_c$$

$$U_m \cdot 2 \cdot \pi \cdot f_c = \Delta \cdot f_{\Delta}$$

$$\Delta = \frac{U_m \cdot 2 \cdot \pi \cdot f_c}{f_{\Delta}}$$

$$A_{3\text{кВ}} = 10 \lg \frac{U_c^2 6 f_{\Delta}^3}{U_m^2 4 \pi^2 f_c^2 f_{\phi}}$$

$$U_c \rightarrow U_{\min}$$

$$U_m \rightarrow U_{\max}$$

$$A_{3\text{кВ}} = 10 \lg \frac{U_{\min}^2 3 f_{\Delta}^3}{U_{\max}^2 2 \pi^2 f_c^2 f_{\phi}} = 20 \lg \frac{U_{\min}}{U_{\max}} + 10 \lg \frac{3 f_{\Delta}^3}{2 \pi^2 f_c^2 f_{\phi}} = -D + 10 \lg \frac{3 f_{\Delta}^3}{2 \pi^2 f_c^2 f_{\phi}}$$

$$f_{\Delta} = \sqrt[3]{\frac{10^{0,1(A_{3\text{кВ}} + D)} 2 \pi^2 f_c^2 f_{\phi}}{3}}$$