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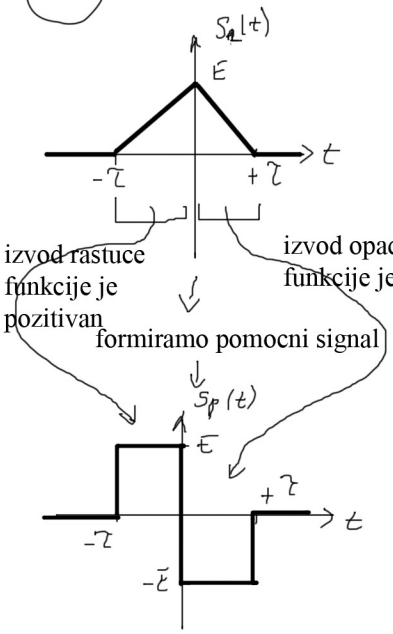
Traženje spektra signala s2(t) preko pomoćnog signala (iskoristićemo rezultat iz prvog dela zadatka)



$$s_2(t) = \begin{cases} 0, & |t| > 0 \\ E + \frac{E}{\tau} t, & -\tau < t < 0 \\ E - \frac{E}{\tau} t, & 0 < t < +\tau \end{cases}$$

$$\frac{d\,s_2(t)}{dt} = \begin{cases} 0, & |t| > \tau \\ \frac{E}{\tau}, & -\tau < t < 0 \\ -\frac{E}{\tau}, & 0 < t < +\tau \end{cases}$$

izvod rastuce funkcije je pozitivan

izvod opadajuce funkcije je negativan

formiramo pomocni signal

$$s_p(t) = \begin{cases} 0, & |t| > \tau \\ E, & -\tau < t < 0 \\ -E, & 0 < t < +\tau \end{cases} \quad \| \quad S_p(j\omega) = j\,2E\tau\,\frac{Sin^2\left(\frac{\omega\tau}{2}\right)}{\frac{\omega\tau}{2}}$$

$$\frac{d\,s_2(t)}{dt} = \frac{s_p(t)}{\tau}$$

PRAVILO

$$s(t) \longrightarrow S(j\omega)$$
$$\frac{d\,s(t)}{dt} \longrightarrow j\omega\,S(j\omega)$$

$$j\omega\,S_2(j\omega) = \frac{S_p(j\omega)}{\tau}$$

$$S_2(j\omega) = \frac{S_p(j\omega)}{j\omega\tau} = \frac{1}{j\omega\tau} \cdot j\,2E\tau\,\frac{Sin^2\left(\frac{\omega\tau}{2}\right)}{\frac{\omega\tau}{2}} = E\cdot\tau\left(\frac{Sin\frac{\omega\tau}{2}}{\frac{\omega\tau}{2}}\right)^2$$