RĪGAS TEHNISKĀ UNIVERSITĀTE
ELEKTRONIKAS UN TELEKOMUNIKĀCIJU FAKULTĀTE
ELEKTRONIKAS PAMATU KATEDRA

Signālu teorijas pamati

# Laboratorijas darbs № 2
# "Iepazīšanās ar periodisku signālu izvērsi trigonometrisku funkciju Furjē rindā"

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Rīga, 2017

## Kompleksu eksponentfunkciju Furjē rinda

$$\frac{1}{2}C_0 = \frac{1}{2}a_0 = \frac{3}{4}$$

$$\frac{1}{2}C_n = \int_{-1/4}^{1/4} e^{-j2\pi nt}\,dt + \int_{-1/8}^{1/8} e^{-j2\pi nt} = \frac{1}{\pi n}\left(\frac{e^{\frac{j\pi n}{2}} - e^{\frac{-j\pi n}{2}}}{j2} + \frac{e^{\frac{j\pi n}{4}} - e^{\frac{-j\pi n}{4}}}{j2}\right) =$$

$$= \frac{1}{\pi n}\left(\sin\left(\frac{\pi n}{2}\right) + \sin\left(\frac{\pi n}{4}\right)\right)$$

$$s(t) = \frac{1}{\pi}\sum_{n=-\infty}^{\infty}\frac{1}{n}\left(\frac{e^{\frac{j\pi n}{2}} - e^{\frac{-j\pi n}{2}}}{j2} + \frac{e^{\frac{j\pi n}{4}} - e^{\frac{-j\pi n}{4}}}{j2}\right)e^{j2\pi nt}$$

| $\frac{1}{2}C_0$ | $\frac{1}{2}C_1$ | $\frac{1}{2}C_2$ | $\frac{1}{2}C_3$ | $\frac{1}{2}C_4$ | $\frac{1}{2}C_5$ | $\frac{1}{2}C_6$ | $\frac{1}{2}C_7$ | $\frac{1}{2}C_8$ | $\frac{1}{2}C_9$ | $\frac{1}{2}C_{10}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\frac{3}{4}$ | $\frac{\sqrt{2}+2}{2\pi}$ | $\frac{1}{2\pi}$ | $\frac{\sqrt{2}-2}{6\pi}$ | $0$ | $\frac{2-\sqrt{2}}{10\pi}$ | $-\frac{1}{6\pi}$ | $\frac{-\sqrt{2}-2}{14\pi}$ | $0$ | $\frac{\sqrt{2}+2}{18\pi}$ | $\frac{1}{10\pi}$ |
| $0.75$ | $0.54$ | $0.16$ | $-0.03$ | $0$ | $0.02$ | $-0.05$ | $-0.08$ | $0$ | $0.06$ | $0.03$ |

## Divpusīgais amplitūdu spektrs