

FOURIEROVI REDOVI

1) Red za funkciju $f(x)$ perioda 2π
 opću :

$$f(x) = \frac{1}{2}a_0 + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$$

neparnu : $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$

parnu : $f(x) = \frac{1}{2}a_0 + \sum_{n=1}^{\infty} a_n \cos nx$

Fourierovi koeficijenti

za opću funkciju $f(x)$ perioda 2π

$$a_0 = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) dx$$

$$a_n = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos nx dx$$

$$b_n = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \sin nx dx$$

za neparnu funkciju $f(x)$
 perioda $[-\pi, \pi]$

$$a_0 = 0 \quad b_n = \frac{2}{\pi} \int_0^{\pi} f(x) \sin nx dx$$

$$a_n = 0$$

za parnu funkciju $f(x)$
 perioda $[-\pi, \pi]$

$$b_n = 0 \quad a_0 = \frac{2}{\pi} \int_0^{\pi} f(x) dx$$

$$a_n = \frac{2}{\pi} \int_0^{\pi} f(x) \cos nx dx$$

za $n = 0, 1, 2, 3, \dots$

$$\sin(n \cdot 0) = 0$$

$$\sin(n \cdot \pi) = 0$$

$$\cos(n \cdot 0) = 1$$

$$\cos(n \cdot \pi) = (-1)^n$$

2) Red za funkciju $f(x)$
 perioda $[a, a+L]$

opću :

$$f(x) = \frac{1}{2}A_0 + \sum_{n=1}^{\infty} \left[A_n \cos \frac{2n\pi}{L}(x-a) + B_n \sin \frac{2n\pi}{L}(x-a) \right]$$

neparnu : $A_0 = 0 \quad A_n = 0$

parnu : $B_n = 0$

Fourierovi koeficijenti

za opću funkciju $f(x)$ perioda $[a, a+L]$

$$A_0 = \frac{2}{L} \int_a^{a+L} f(x) dx$$

$$A_n = \frac{2}{L} \int_a^{a+L} f(x) \cos \frac{2n\pi}{L}(x-a) dx$$

$$B_n = \frac{2}{L} \int_a^{a+L} f(x) \sin \frac{2n\pi}{L}(x-a) dx$$

za neparnu funkciju $f(x)$
 perioda $[-\frac{L}{2}, \frac{L}{2}]$

$$A_0 = 0 \quad B_n = \frac{4}{L} \int_0^{+L/2} f(x) \sin \frac{2n\pi}{L} x dx$$

$$A_n = 0$$

za parnu funkciju $f(x)$
 perioda $[-\frac{L}{2}, \frac{L}{2}]$

$$A_0 = \frac{4}{L} \int_0^{+L/2} f(x) dx$$

$$B_n = 0$$

$$A_n = \frac{4}{L} \int_0^{+L/2} f(x) \cos \frac{2n\pi}{L} x dx$$