>

実習15.2

> $f := x \to \mathrm{signum}(x)$

$$f := x \mapsto \mathrm{signum}(x) \tag{1}$$

> $a := n \to \left(\frac{1}{\mathrm{Pi}}\right) \cdot (int(f(x) \cdot \cos(n \cdot x), x = -\mathrm{Pi}..\mathrm{Pi}))$

$$a := n \mapsto \frac{\int_{-\pi}^{\pi} f(x)\cos(n\,x)\,dx}{\pi} \tag{2}$$

> $b := n \to \left(\frac{1}{\mathrm{Pi}}\right) \cdot (int(f(x) \cdot \sin(n \cdot x), x = -\mathrm{Pi}..\mathrm{Pi}))$

$$b := n \mapsto \frac{\int_{-\pi}^{\pi} f(x)\sin(n\,x)\,dx}{\pi} \tag{3}$$

> $s := (x, m) \to \frac{a(0)}{2} + sum(a(n) \cdot \cos(n \cdot x) + b(n) \cdot \sin(n \cdot x), n = 1..m)$

$$s := (x, m) \mapsto \frac{a(0)}{2} + \sum_{n=1}^{m} (a(n)\cos(n\,x) + b(n)\sin(n\,x)) \tag{4}$$

> $s(x, 1)$

$$\frac{4\sin(x)}{\pi} \tag{5}$$

> $s(x, 5)$

$$\frac{4\sin(x)}{\pi} + \frac{4\sin(3\,x)}{3\,\pi} + \frac{4\sin(5\,x)}{5\,\pi} \tag{6}$$

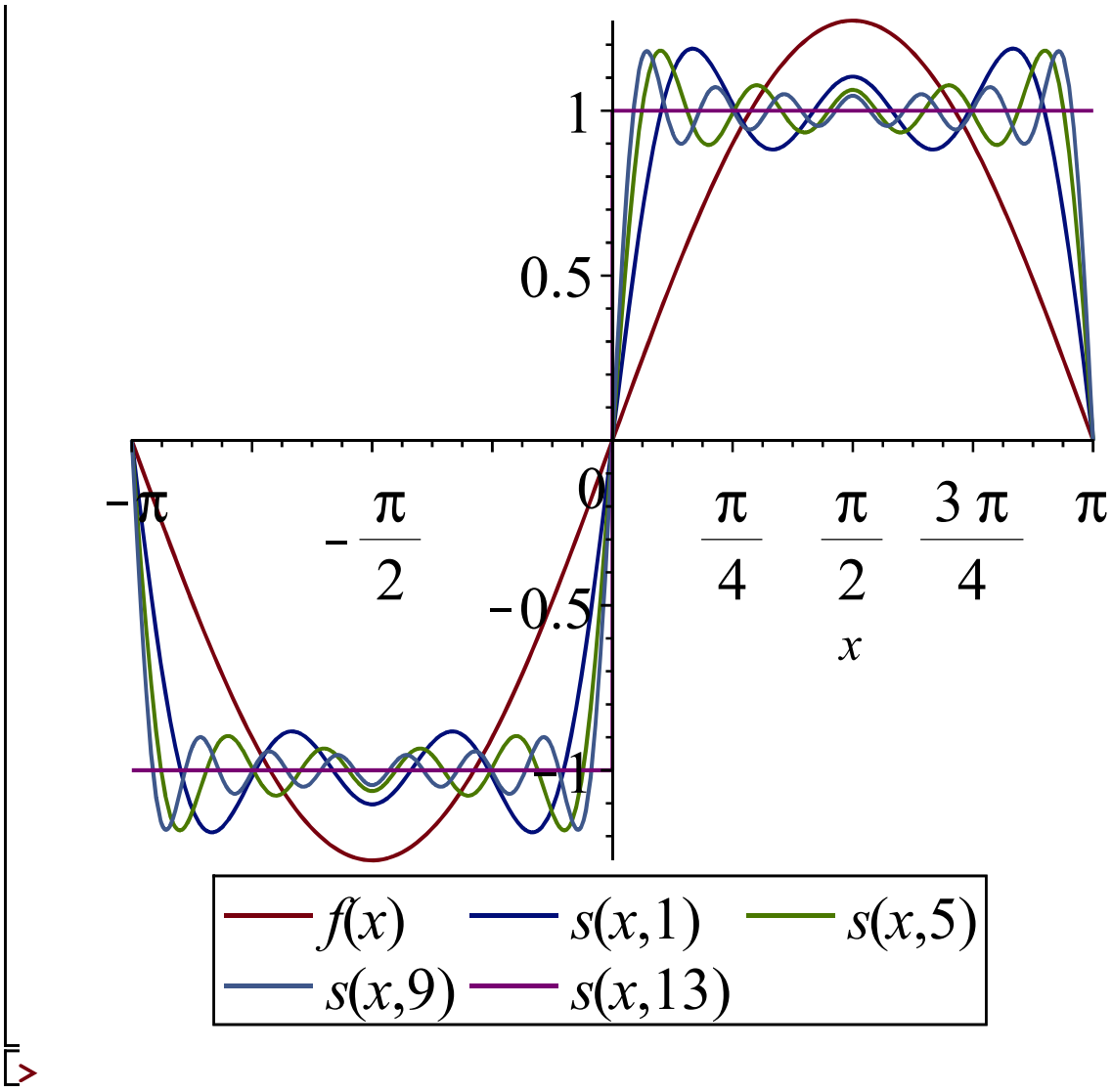
> $s(x, 9)$

$$\frac{4\sin(x)}{\pi} + \frac{4\sin(3\,x)}{3\,\pi} + \frac{4\sin(5\,x)}{5\,\pi} + \frac{4\sin(7\,x)}{7\,\pi} + \frac{4\sin(9\,x)}{9\,\pi} \tag{7}$$

> $s(x, 13)$

$$\frac{4\sin(x)}{\pi} + \frac{4\sin(3\,x)}{3\,\pi} + \frac{4\sin(5\,x)}{5\,\pi} + \frac{4\sin(7\,x)}{7\,\pi} + \frac{4\sin(9\,x)}{9\,\pi} + \frac{4\sin(11\,x)}{11\,\pi} + \frac{4\sin(13\,x)}{13\,\pi} \tag{8}$$

> $plot(\{f(x), s(x, 1), s(x, 5), s(x, 9), s(x, 13)\}, x = -\mathrm{Pi}..\mathrm{Pi})$


1
0.5
-π
-π/2
0
π/4
π/2
3π/4
π
-0.5
-1
x
f(x)
s(x,1)
s(x,5)
s(x,9)
s(x,13)