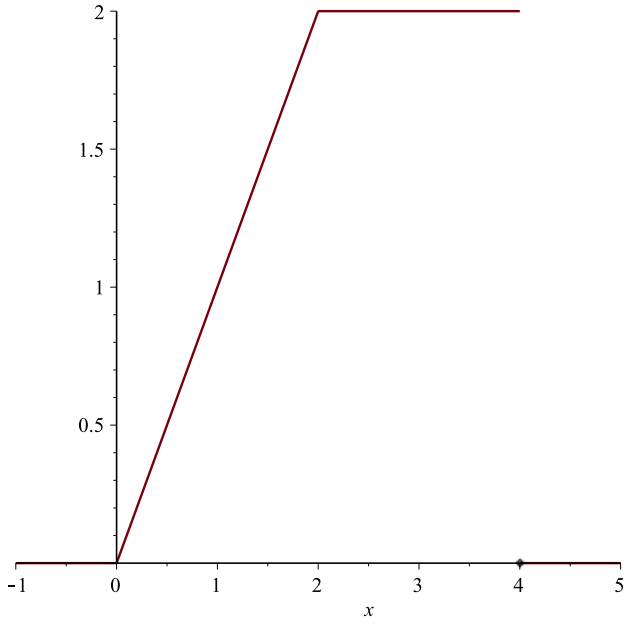
> $f := x \rightarrow \begin{cases} x & x \geq 0 \text{ and } x < 2 \\ 2 & x \geq 2 \text{ and } x < 4 \end{cases}$

$f := x \rightarrow piecewise(0 \leq x \text{ and } x < 2, x, 2 \leq x \text{ and } x < 4, 2)$ **(1)**

> $plot(f(x), x = -1..5, discont = true)$



>

> $a0 := \frac{simplify(int(f(x), x = 0..4))}{1}$

Error, missing denominator

$a0 := \frac{simplify(int(f(x), x = 0..4))}{2}$

> $an := \frac{simplify(int(f(x) \cdot \cos(n \cdot \mathrm{Pi} \cdot x), x = 0..4)) \text{ assuming } n :: posint}{1}$

$an := 0$ **(2)**

> $bn := \frac{simplify(int(f(x) \cdot \sin(n \cdot \mathrm{Pi} \cdot x), x = 0..4)) \text{ assuming } n :: posint}{1}$

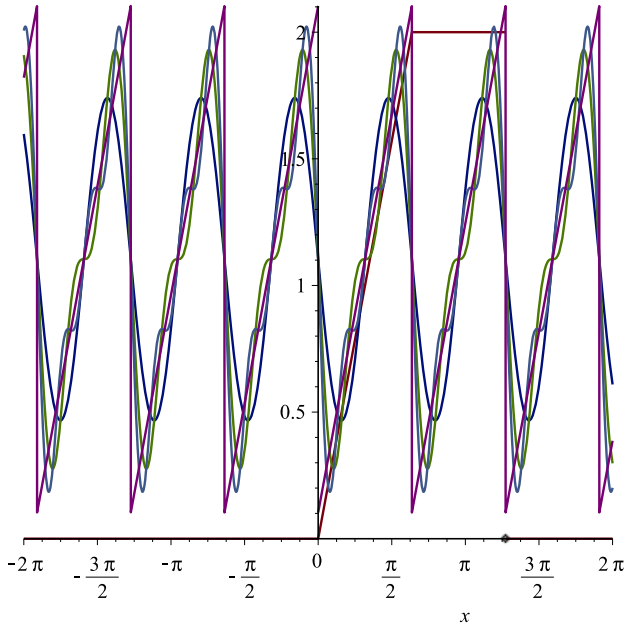
$bn := -\frac{2}{n\,\pi}$ **(3)**

> $S := (x, k) \to \frac{a0}{2} + \sum_{n=1}^{k} (an \cdot \cos(n \cdot \mathrm{Pi} \cdot x) + bn \cdot \sin(n \cdot \mathrm{Pi} \cdot x))$

$$S := (x, k) \to \frac{1}{2}\, a0 + \sum_{n=1}^{k} \left(an \cos\left(n\, \pi\, x\right) + bn \sin\left(n\, \pi\, x\right)\right) \tag{4}$$

>

> $plot([f(x), S(x, 1), S(x, 2), S(x, 3), S(x, infinity)], discont = true)$



> $\frac{1}{\mathrm{Pi}} \int_{-\mathrm{Pi}}^{\mathrm{Pi}} f(x)\, \mathrm{d}x$

$$\frac{-2 + 2\, \pi}{\pi} \tag{5}$$

> $'\frac{1}{\mathrm{Pi}} \int_{-\mathrm{Pi}}^{\mathrm{Pi}} f(x) \cos(nx)\, \mathrm{d}x' = an$

(6)

$$\frac{\int_{-\pi}^{\pi} f(x)\,\cos(nx)\,dx}{\pi} = 0 \qquad (6)$$

> $'\frac{1}{\mathrm{Pi}}\int_{-\mathrm{Pi}}^{\mathrm{Pi}} f(x)\sin(nx)\,dx' = bn$

$$\frac{\int_{-\pi}^{\pi} f(x)\,\sin(nx)\,dx}{\pi} = -\frac{2}{n\,\pi} \qquad (7)$$

> $S := (x,k) \to \frac{\frac{6}{\mathrm{e}}}{2} + \sum_{n=i}^{k}\left(-\frac{2}{n\,\pi}\cdot\sin(n\cdot\mathrm{Pi}\cdot x)\right)$

$$S := (x,k) \to \frac{3}{\mathrm{e}} + \sum_{n=i}^{k}\left(-\frac{2\,\sin(n\,\pi\,x)}{n\,\pi}\right) \qquad (8)$$

>