> $bn := \frac{1}{int\left(\sin^2\left(\frac{n \cdot \mathrm{Pi} \cdot x}{L}\right), x = 0 .. L\right)} \left(int\left(\frac{2 \cdot M \cdot x}{L} \cdot \sin\left(\frac{n \cdot \mathrm{Pi} \cdot x}{L}\right), x = 0 .. \frac{L}{2}\right) + int\left(\frac{2 \cdot M \cdot (L - x)}{L} \cdot \sin\left(\frac{n \cdot \mathrm{Pi} \cdot x}{L}\right), x = \frac{L}{2} .. L\right)\right) \mathrm{assuming}(L > 0, n, integer) :$

> $bn := simplify(bn)$

$$bn := \frac{8 M \sin\left(\frac{n \pi}{2}\right)}{n^2 \pi^2} \quad \textbf{(1)}$$

> $\mathrm{phi} := \sin\left(\frac{n \cdot \mathrm{Pi} \cdot x}{L}\right)$

$$\phi := \sin\left(\frac{n \pi x}{L}\right) \quad \textbf{(2)}$$

> $psum := subs(M = 1, L = 10, sum(bn \cdot \mathrm{phi}, n = 1 .. 100)) :$

> $plot(psum, x = 0 .. 10) :$

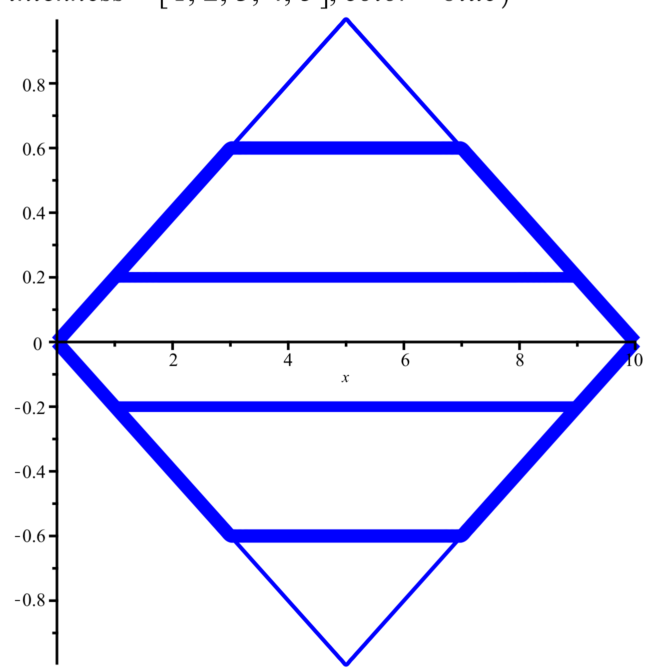
> $with(plots) :$

> $psum := subs\left(M = 1, L = 10, sum\left(bn \cdot \sin\left(\frac{n \cdot \mathrm{Pi} \cdot x}{L}\right) \cdot \cos\left(\frac{n \cdot \mathrm{Pi} \cdot t}{L}\right), n = 1 .. 200\right)\right) :$

> $animate(psum, x = 0 .. 10, t = 0 .. 20) :$

> $curves := [seq(subs(t = 2 \cdot m, psum), m = 0 .. 10)] :$

> $plot(curves, x = 0 .. 10, thickness = [1, 2, 3, 4, 5], color = blue)$



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