54)

$$f(t) := \begin{cases} 2\cdot\cos(t) & \text{if } 0 \le \left|\mathrm{mod}(t, 2\cdot\pi)\right| < \frac{\pi}{2} \\ 0 & \text{if } \frac{\pi}{2} \le \left|\mathrm{mod}(t, 2\cdot\pi)\right| < \frac{3\pi}{2} \\ 2\cdot\cos(t) & \text{if } \frac{3\pi}{2} \le \left|\mathrm{mod}(t, 2\pi)\right| < 2\pi \end{cases}$$

$$a(n) := \begin{cases} 0 & \text{if } \mathrm{mod}(n, 2) = 1 \\ \frac{4}{\pi\cdot\left(n^2 - 1\right)} & \text{if } \mathrm{mod}(n, 4) = 2 \\ \frac{-4}{\pi\cdot\left(n^2 - 1\right)} & \text{if } \mathrm{mod}(n, 4) = 0 \end{cases}$$

$$S_f(t) := \frac{2}{\pi} + \cos(t) + \sum_{n=2}^{8} \left(a(n)\cdot\cos(n\cdot t)\right)$$