Fourier expansion

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Solution: *Trigonometric rules allow us to calculate,*

$$f(\xi) = \sin^3 \xi = \tfrac{3}{4} \sin \xi - \tfrac{1}{4} \sin 3\xi \ .$$

But the same result can be obtained by Fourier expansion. For symmetry reasons it is clear that $a_0 = 0 = a_n$*. The coefficients,*

$$b_n = \frac{1}{\sqrt{\pi}} \int_{-\pi}^{\pi} \sin^3 \xi \sin n\xi d\xi = \frac{12 \sin n\pi}{n^4 - 10n^2 + 9}$$

only do not disappear for $n = 1$ *and* $n = 3$*. The graph on the left of the figure shows the two expansion terms separately, while the graph on the right shows the sum* $f(\alpha)$*.*

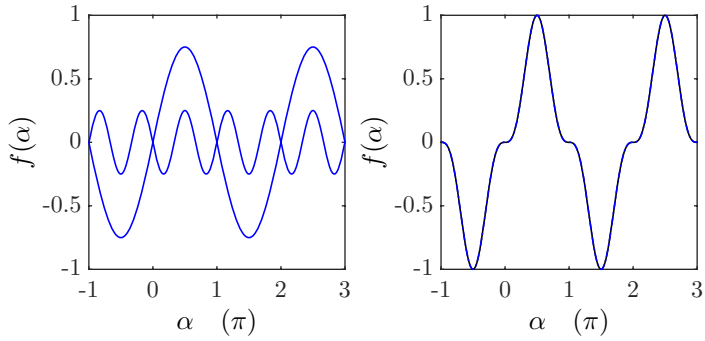

Figure 2.21: (code)