Plotting Fourier Series Partial Sums by Adding Harmonic Terms

Worked example / complete source key

For a square wave with first term $(4/\pi)\sin t$ and second nonzero term $(4/(3\pi))\sin 3t$, compute S_1 and S_2 at $t = \pi/2$ and $t = \pi/6$. Use $\pi \approx 3.14$ and give decimals to two places.

Answer: At $t = \pi/2$: $\sin(\pi/2) = 1$ and $\sin(3\pi/2) = -1$. Term 1 $= 4/\pi \approx 1.27$. Term 2 $= (4/(3\pi))(-1) \approx -0.42$. $S_1 \approx 1.27$; $S_2 \approx 1.27 - 0.42 = 0.85$. At $t = \pi/6$: $\sin(\pi/6) = 0.5$ and $\sin(\pi/2) = 1$. Term 1 $= (4/\pi)(0.5) = 2/\pi \approx 0.64$. Term 2 $= (4/(3\pi))(1) \approx 0.42$. $S_1 \approx 0.64$; $S_2 \approx 0.64 + 0.42 = 1.06$.