Concept Question 13-8: What is the Gibbs phenomenon?

$\phi_4 = 0 \quad \phi_5 = 0$

$4\omega_0 \qquad 5\omega_0$

ectrum

Gibbs
phenomenon

1000
terms

(f) $n_{max} = 1000$
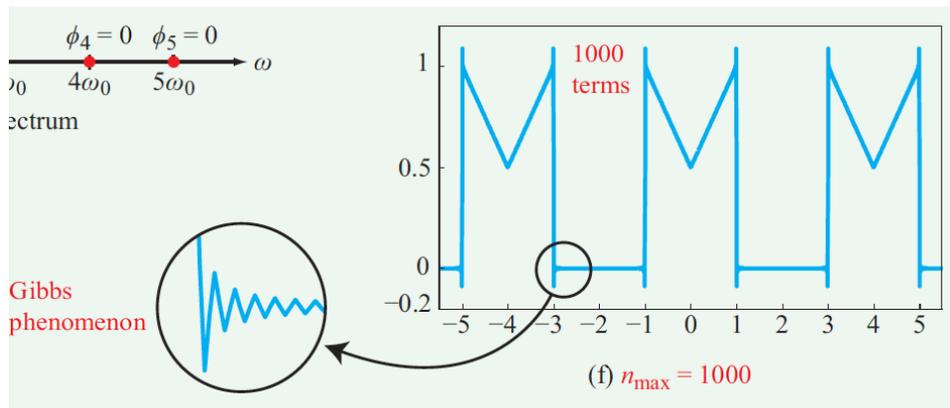
The Fourier series provides an exact representation of a periodic function if the series contains an infinite number of terms. For most waveforms, a finite number of terms is sufficient to provide a good approximation, but if the waveform has discontinuities, the finite (truncated) series exhibits the Gibbs phenomenon (in the form of oscillations) at edges and discontinuities.