Fourier Series $f(x)$ on $[-L, L]$

$$a_0 + \sum_1^\infty a_n \cos\left(\frac{n\pi x}{L}\right) + b_n \sin\left(\frac{n\pi x}{L}\right)$$

Fourier Sine Series $f(x)$ on $[0, L]$

$$\sum_{n=1}^\infty b_n \sin\left(\frac{n\pi x}{L}\right)$$

Fourier Cosine Series $f(x)$ on $[0, L]$

$$a_0 + \sum_1^\infty a_n \cos\left(\frac{n\pi x}{L}\right)$$

Fourier Series

$$a_0 = \frac{1}{2L}\int_{-L}^{L} f \qquad a_n = \frac{2}{2L}\int_{-L}^{L} f(x)\cos\left(\frac{n\pi x}{L}\right)dx$$

$$b_n = \frac{2}{2L}\int_{-L}^{L} f(x)\sin\left(\frac{n\pi x}{L}\right)dx$$

F. Sine Series:

$$b_n = \frac{2}{L}\int_0^L f(x)\sin\left(\frac{n\pi x}{L}\right)dx$$

F. Cosine Series:

$$a_0 = \frac{1}{L}\int_0^L f, \quad a_n = \frac{2}{L}\int_0^L f(x)\cos\left(\frac{n\pi x}{L}\right)dx$$