

$$\text{Fourier Series} = a_0 + \sum a_n \cos\left(\frac{2n\pi y}{b-a} - \left(\frac{a+b}{b-a}\right)n\pi\right) + b_n \sin(\text{same}) = \frac{f(y+) + f(y-)}{2} \stackrel{\text{Mostly}}{=} f(y)$$

Write a_0 in terms of a, b

$$a_0 = \frac{1}{2L} \int_{-L}^L f_1(x) dx = \frac{1}{2L} \int_a^b f(y) \frac{2L}{b-a} dy$$

$$a_0 = \frac{1}{b-a} \int_a^b f(y) dy$$

x	y
L	b
$-L$	a

$f_1 = f$ image under $y \mapsto x$.

$$f_1(x) = f(y)$$

$$y = \frac{a+b}{2} + \frac{b-a}{2} \frac{x}{L}$$

$$dy = \frac{b-a}{2} \frac{dx}{L}$$