

# Fourier analysis

Boas ch. 7

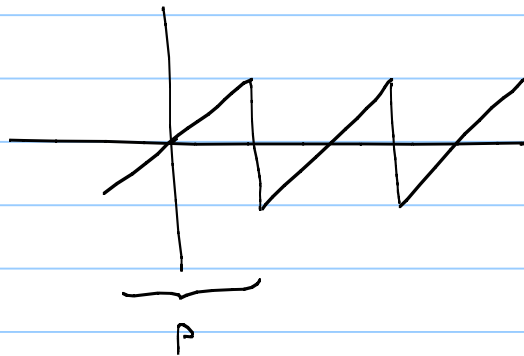
Note Title

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A few defs:

A function is periodic with period  $P$  if

$$f(x+P) = f(x) \text{ for all } x$$

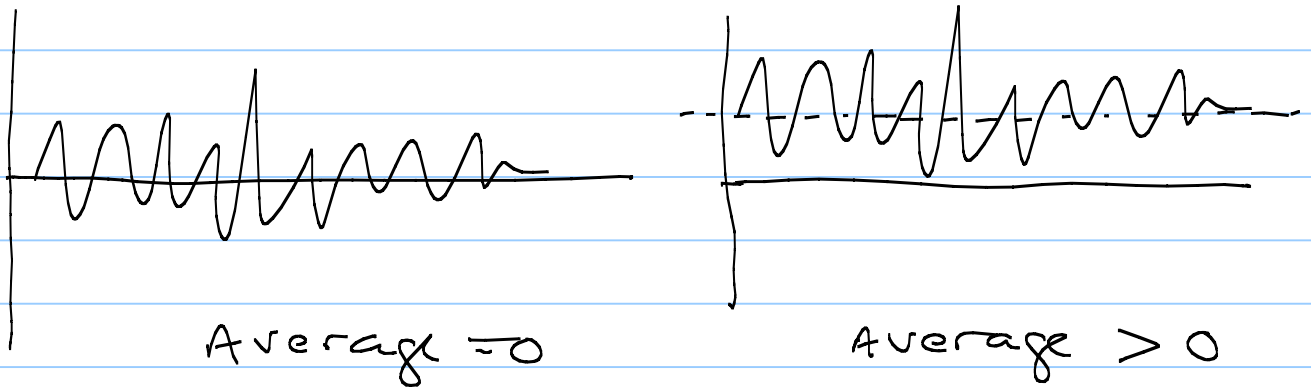


The average value of a function  $f(x)$  on an interval  $f(x)$  is

$$\frac{1}{b-a} \int_a^b f(x) dx$$

for time series we call this

the DC component



suppose  $f(x) = f(x+p)$

$$f(ax) = f(ax+p)$$
$$= f(a(x + \frac{p}{a}))$$

E.g. period of  $\sin 3x$  is  $\frac{2\pi}{3}$

if  $f(x) = f(x+p)$  then

$$\int_c^{c+p} f(x) dx = \int_0^p f(x) dx$$

Try to prove this

Also you might want to look at ch 4. of "Linear systems" to which I have a link on the wiki