## Why Fourier series

<div align="center">海大河海系      陳正宗</div>

Loading expansion:

any external force, $f_e(t)$, with a period $2p$, we have

$$f_e(t) = \frac{1}{2}a_0 + \sum_{n=1}^{\infty}\{a_n cos(\frac{n\pi t}{p}) + b_n sin(\frac{n\pi t}{p})\}$$

$$\ddot{x}(t) + \omega^2 x(t) = f_e(t)$$

Understand the physical phenomenon(dominant freuency of Taipei basin)

Use FFT analyzer

Save storage for memory

To understand the frequency content and wave-number content.

Wave spectrum

Frequency spectrum

地震能譜、反應譜

食譜、菜譜、音譜

有譜! 無譜!