

# EE313 Lecture 17

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Midterm 2 Nov 5th

Fourier properties

1. Time shifting

$a_n$  same, phase change.

$$x(t) \xleftrightarrow{F} a_k$$

$$x(t - t_0) \xleftrightarrow{F} e^{-jk\omega_0 t_0} \cdot a_k.$$

2.

3. Even and odd

$$x(t) = x(-t) \xleftrightarrow{F} a_k \text{ evenspectrum}$$

4. Time scaling, Multiplication in time

$$x(t) \leftrightarrow a_k$$

$$y(t) \leftrightarrow b_k$$

$$x(t) \cdot y(t) \leftrightarrow h_k = \sum_{l=-\infty}^{\infty} a_l \cdot b_{k-l}.$$

(!) convolution (!)

5. Conjugation

$$x(t) \leftrightarrow a_k$$

$$x^*(t) \leftrightarrow a_{-k}^*$$