Midterm is postponed until next Tuesday (9/27).
Thursday class I will review some questions asked by students.
Extra office hour: 9-23, 2:00pm-3:30pm.

Complex numbers and functions, Chapter 2.
Complex numbers: Definitions, two forms, algebraic operations.

**Exercise 1:** Find the modules of following number:
(a). \( z = (1 + 2i)^{-2} \);
(b). \( z = e^{2+4i} \).

**Exercise 2:** Find the real and imaginary parts of of following number:
(a). \( z = (1 + 2i)^{-2} \);
(b). \( z = e^{2+4i} \).

Complex functions: Power series, exponential functions, trigonometric functions, logarithmic functions, powers and roots.

**Exercise 3:** Find the real and imaginary parts of of following number:
(a). \( z = (1 + 2i)^{-2} \);
(b). \( z = e^{2+4i} \).

**Exercise 4:** Find all numbers \( z \) satisfies
(a). \( z^2 = 1 + \sqrt{3}i \);
(b). \( e^z = 2i \).

Fourier series, Chapter 7
Harmonic functions, periodic functions: Period, amplitude, ”orthogonal” of two harmonic functions.

**Exercise 5:**
(a). (Brain teaser?) If \( f(x) \) is a periodic function with period \( l \), show that \( f(x) \) is also a \( 2l \) periodic function.
(b). Computer

\[
\int_{-\pi}^{\pi} e^{2x} \cdot e^{-3x} \, dx = ?
\]
Fourier series: How to find Fourier coefficients. Parseval’s theorem and applications.

**Exercise 6:**

(a). Find Fourier series for

\[ f(x) = \begin{cases} 
-1, & -l \leq x < 0, \\
1, & 0 \leq x < l.
\end{cases} \]

(b). Using above Fourier series and Parseval’s theorem to compute

\[ 1 + \frac{1}{3^2} + \frac{1}{5^2} + \cdots. \]
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