

# MATLAB Brush Up Course

## Practice Set 4

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### Problem 1: Matlab Objects

#### 1. Function Plot

- Plot the function  $f(x) = e^{-x} \sin(10x)$  for  $x$  ranging from 0 to  $2\pi$ .
- Use a dashed red line for the plot.
- Label the axes as 'x' and 'f(x)'.

#### 2. Multi-Distribution Histogram

- Generate and overlay histograms of 1000 samples each from two distributions:
  - Normal distribution with  $\mu = 0$ ,  $\sigma = 1$ .
  - Uniform distribution between -2 and 2.
- Use different colors for each histogram and include a legend.

#### 3. Economic Growth Scatter Plot

- Simulate GDP growth rates for two countries (100 observations each) using random values:
  - Country A: GDP growth rates normally distributed around 2% with a standard deviation of 0.5%.
  - Country B: GDP growth rates uniformly distributed between 1% and 3%.
- Create a scatter plot comparing the GDP growth rates of the two countries.
- Label the axes as 'Country A Growth Rate' and 'Country B Growth Rate'.

### Problem 2: WB Data

#### 1. Comparative GDP Analysis

- Compare the GDP of two countries: 'United States' and 'China'.
- Calculate the mean GDP rate for each country.

- Create a line plot showing their GDP trends over this period, with distinct colors and a legend.
2. Time Trend Analysis in Interest Rates
- Analyze the time trend of interest rate spreads globally from 1960 to 2022.
  - Calculate the correlation coefficient between the year and interest rate spreads.
  - Create a scatter plot showing the trend of interest rate spreads over the years. Limit the y-axis between -20 and 30.