Signal Analysis
Lab 5: DFT and IDFT

Jyoti Behura
jbehura@mines.edu

Due: Nov 6, Group A - 10:00am, Group B - 2.00pm

1) Write a function in the programming language of your choice (preferably Matlab or Python) that computes the normalized Discrete Fourier Transform (DFT) $X[n]$ of an input sequence $x[k]$. Use the following convention:
$$X[n] = \sum_{k=0}^{N-1} x[k] e^{i(2\pi/N)nk}.$$
2) Use the above function to find and plot the DFT of the data in the file $Lab5\_t\_xt.dat$. Plot the shifted and normalized 2-sided amplitude and phase spectra.
3) Write a function that computes the IDFT of any input spectrum $X[n]$.
4) Use the above IDFT function to compute the IDFT of the spectrum in (2). Plot it and superimpose on the input $x[k]$ in (2). Are they the same?