Problem Set 1

Due by 2/10

You will use `NumPy` module to answer the following questions. Import `numpy` as `np`.

(1) You will generate a numeric array of size 21 by 21 and will name it `tmp`. To do so, draw $21 \times 21 = 441$ random observations from the standard normal distribution. Before doing so, set the seed for the random number generator to 37. See help for `random.seed()` in NumPy.

(2) Change the diagonal elements of `tmp` to 1s.

(3) Calculate condition number of `tmp`. See help for `linalg.cond()` in NumPy.

(4) Calculate the inverse of `tmp`. See help for `linalg.inv()` in NumPy.

(5) Calculate the trace of `tmp`.

(6) Sort `tmp` across rows.

(7) Delete the last row and last column from `tmp` and name the subarray as `tmp` again.

(8) Reshape `tmp` as 40 by 10 array and name it as `tmp1`.

(9) Repeat `tmp1` four times to generate 40 by 40 array, and name it as `tmp2`. See help for `tile()` in NumPy.

(10) Calculate condition number of `tmp2`.

(11) Calculate the inverse of `tmp2`.

(12) Change all nonpositive ($<= 0$) elements of `tmp2` to 0.5.

(13) Set the first row and first column element of `tmp2` to its negative value.

(14) Now take the natural log of `tmp2` and name it as `tmp3`.

(15) Find the indices for `NaN` values in `tmp3`.