Lab 3: Plotting with matplotlib

Due date: Sunday Feb 17, 11:59pm

The task is to construct a plot that shows the distribution of x and y in a contour or density plot (for example use matplotlib with `hist2d`) and show the marginal histograms of the x and y values. See Figure 1

- Generate 5000 random X values that come from a from a Normal distribution with mean 10 and standard deviation of 20 (this is available in the module `random`), generate 5000 Y values that come from a gamma distribution (also in `random`) with shape $\alpha = 5$, and scale $\beta = 2$. [do not use `numpy`!]

- Generate a density histogram of the X, Y coordinates, there are several way possible, for example use `hist2d`.

- Generate histograms for X and Y, these are the marginal distributions.

- Generate a plot that has on the top or bottom side of the X/Y density plot the X marginals and on the left or right side of the X/Y density plot the Y marginals.

- use a different color scheme than the default, the figure is only an example do not copy it.

- Create the combined plot using `subplots` or using `gridspec`.

- Label the axes appropriately.

- The python program should be callable like this: `python yourname3.py` that then generates a PDF figure called `yournamefigure.pdf`
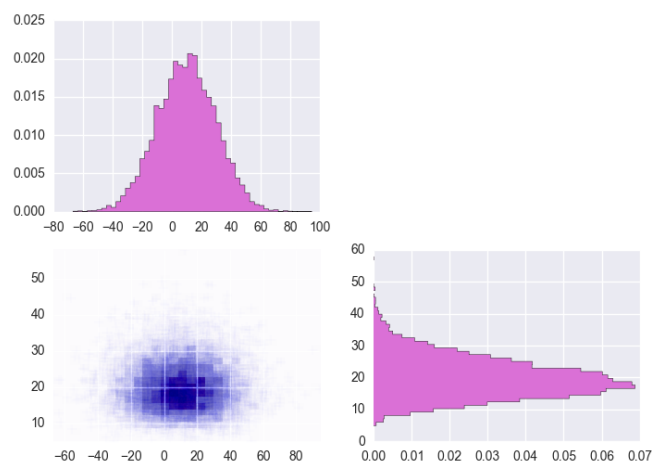
- Submit your python script to CANVAS.

Figure 1: Figure that shows data that was drawn from two distributions, one for x and one for y coordinates with the marginal distributions. Your figure may look differrently than this (deficient) example.