ESE 605-001: Modern Convex Optimization	**Spring 2021**
Homework 5	
Assigned: 03/30/2021	*Due: 04/09/2021*

Homework must be LaTeX'd or it will not be graded.

You are expected to provide complete and rigorous solutions to all questions. Do not leave portions of your solutions as "exercises for the grader." If you use external resources please be sure to cite them.

Problems with an A preceding the number are from the additional exercises `https://web.stanford.edu/~boyd/cvxbook/bv_cvxbook_extra_exercises.pdf`. Some of the homework problems will require data-files that can be found here `https://web.stanford.edu/~boyd/cvxbook/cvxbook_additional_exercises/`. In some cases, only Matlab files are available: in that case, we have made Python versions of the data (or scripts that convert the .m files to .py files) available here: `https://www.dropbox.com/sh/tyq7i6b6048ycbf/AACrPBTOERrCHNzeaCk9Tj2Ea?dl=0`. If you are using Julia or R, let the teaching staff know if you need help converting the .m files.

Problems from Boyd & Vandenberghe: A5.3, A5.6 (Matlab use `tv_img_interp.m` from cvxbook website, Python use `tv_inpainting.ipynb` from Dropbox link), A5.10 (Python see `load_sp_ln_sp_data.py` in Dropbox), 7.8, A6.3, A6.6, A6.21, 8.13, 8.23, A7.6

Bonus questions: Bonus questions are completely optional. If a certain threshold of correctness is exceeded, you will earn up to an additional 2 marks per question on your assignment grade. These are fun, challenging problems, and we ask that you try your best to get as far into the proofs/answers as you can *without consulting any outside sources!* Once you get stuck, indicate the point at which you were stuck in your solutions with a "**I made it this far on my own**," after which, you should indicate what outside source you consulted in order to finish the problem, in accordance with the Penn Academic Integrity policy.

1. Additional Exercises A5.5

2. Additional Exercises A6.13

3. B&V 8.5

4. B&V 8.14