

## Assignment 4

Please refer the papers reading4-1, reading4-2, and reading4-3 to solve following problems.

- 1 (2 points)** Show that the objective function in the paper reading4-3 is neither submodular nor supermodular.
- 2 (2 points)** Show that the objective function in the paper reading4-2 has a monotone nondecreasing submodular upper bound and a monotone nondecreasing submodular lower bound.
- 3 (2 points)** Show that any set function has a monotone nonincreasing supermodular upper bound and a monotone nonincreasing supermodular lower bound.
- 4 (2 points)** Can you give a DS decomposition to the objective function in the paper reading4-2?
- 5 (2 points)** Design a method to apply the submodular-supermodular procedure to the maximization problem in the paper reading4-2 in case that you cannot find a DS decomposition for the objective function.