DATA130026.01 Optimization
Assignment 8
Due Time: at the beginning of the class, May. 18, 2021

1. Derive the dual problems of the SDP and SOCP problems in Question 4 in Assignment 7. Write CVX codes to solve the associated dual problems and show the optimal solutions. (Hint: refer the User's guide for CVX, e.g., from http://cvxr.com/cvx/doc/sdp.html)

2. Prove that

$$\max_z \left\{ p^T z : \|z\|_2^2 \le R^2, \|z\|_\infty \le 1 \right\} = \min_{u,v} \left\{ \|u\|_1 + R\|v\|_2 : u + v = p \right\}.$$

   Hint: using strong duality and conjugate functions.

3. Demonstrate by an example that the relation $0 \preceq A \preceq B$ does not necessary imply that $A^2 \preceq B^2$.