Homework 4 (EE7600 MIMO Systems for Wireless Communications)

1. Given the following diagonal unitary constellations with $L = 8$ signal points

$$\Omega_u = \left\{ V_\ell = \begin{pmatrix} e^{i(2\pi/L)} & 0 \\ 0 & e^{i(2\pi/L)u} \end{pmatrix}^\ell, \quad \ell = 1, 2, \ldots, L \right\},$$

where the integer $u \in \{1, 2, \ldots, L\}$, find the optimum u^* such that the constellation Ω_{u^*} has the largest diversity product among all u.

2. List design criteria for space-time coherent and differential constellations and, under these criteria, describe the method to design the *diagonal unitary constellations* for any number of transmit antennas.