

**EE672: Game Theory for Wireless Networks**  
**Homework 2**

1. Consider a game in which 2 players transmit packets in a network with a selected power  $x \in [1, A]$  and  $y \in [1, A]$ , respectively. The utility of the players can be expressed as:

$$u_i(x, y) = \log(x) + \log(y), \quad i = 1, 2$$

- (a) Does this game have a pure strategy Nash equilibrium? If yes, what is the Nash equilibrium? Motivate analytically your answer.
- (b) If we apply the transformation  $g = \exp(u)$  to the utility function, does the new utility function

$$U_i(x, y) = \exp(\log(x) + \log(y))$$

guarantee a pure Nash equilibrium solution? Again, motivate your answer.