# Networked Life Homework 5

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**Exercise 1**

1. ① = 0.5

②

**Exercise 2**

1. i+1

, the value doesn’t depend on j

**Exercise 3**

Yes, there is a tragedy of the commons. At equilibrium, when n = A/c, U=0.

At social optimum, when n = A/2c, U > 0 and it is maximized. As more people join the movie after social optimum, the total utility decrease.

1. Net benefit:

**Exercise 4**



Therefore, and

1. and ,
2. Case 1:

Case 2:

In case 1, as the number of users increases, the price will increase as the match demand with limited supply. However, in case 2, the price stays the same as the marginal cost.

1. The cost can be recovered by letting all users split the cost equally. The downside of this scheme is that this fixed cost will exceed some users’ consumer surplus. This will result in them leaving the network and joining its competitors.

When U’=p,

And from, we can get ,

Case 1:

In this case, player 2 will benefit. After being charged a fixed fee equal to player 1’s surplus, player 2 still has some consumer surplus left.

Case 2:

In this case, both players are almost equally well off. Player 1 has a surplus of 0 as he wouldn’t participate, while player 2 also has almost 0 surplus as the operator charges a fixed fee equal to his surplus.

Comparison: