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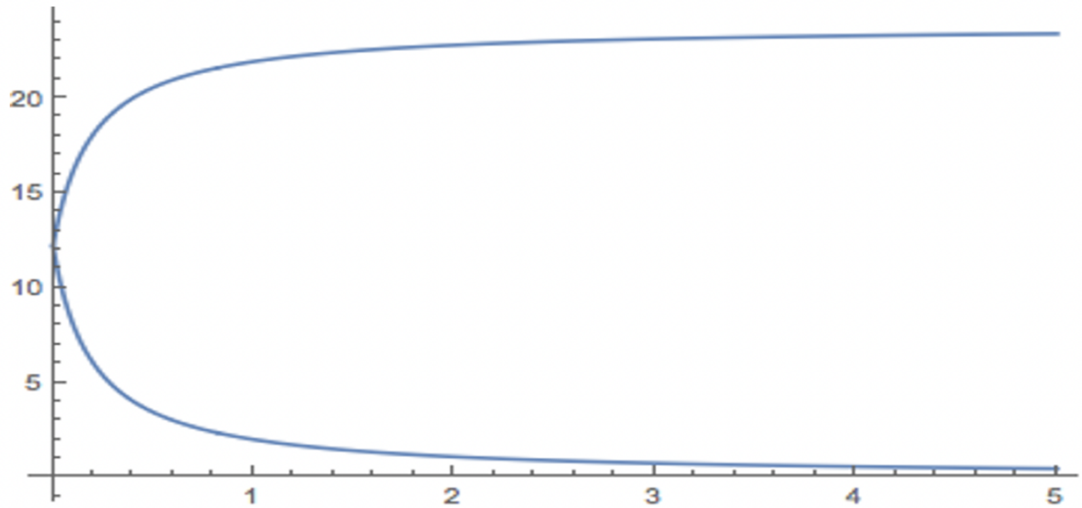
Homework 4
Managing Disruptive Technologies
Fall 2021

1. For the first plot :

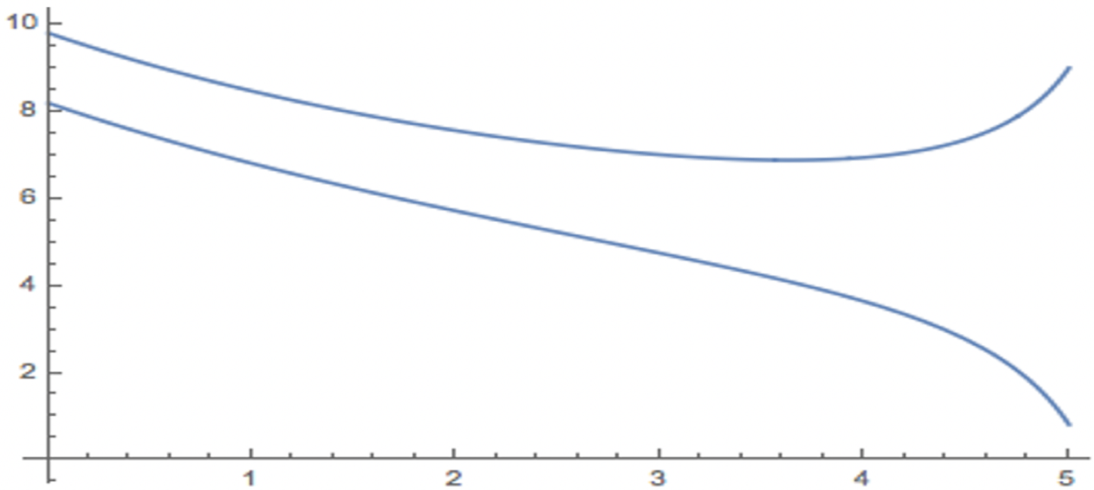


a. $P_1(x)$: D1 = 100 - 2.1 P_1 - 2 P_2
$P_2(x)$: D2 = 100 - (2.1+x) P_2 - 2 P_1
$P_1(x)$ represents the curve(above) that is increasing with x since its elasticity is lesser, hence higher price can be charged for product 1 than product 2
$P_2(x)$ represents the curve(below) that is decreasing with x since its elasticity is greater, hence the lower price has to be charged for product 2 in comparison to product 1

b. At x=0, the elasticity for both the curves is identical i.e 2.1. Theoptimal price for product 1 is equal to optimal price for product 2 and hence, the curves intersect at x=0

c. As x increases, the gap between the elasticities of product 1 and product 2 increases. Higher price is charged for lower elasticity and lower price is charged for a higher elasticity. Therefore, as x increases, the relative decrease in price for product 2 and the relative increase in price for product 1 leads to the two curves diverging from each other as shown in the figure above.

For the second plot :



d. $P_1(x)$: D1 = 100 - 6.1 P_1 - z P_2
$P_2(x)$: D2 = 100 - 5.1 P_2 - z P_1
$P_2(x)$ represents the curve that is above with z since its elasticity is lesser
$P_1(x)$ represents the curve that is below with z since its elasticity is greater

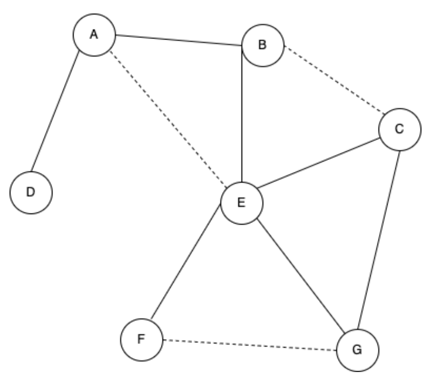
e. At z=0, elasticity for product 2 is lesser than the elasticity for product 1. Hence, product 2 will be charged higher than product 1. Hence, p2 is above p1

f. The gap between the two curves represents the strength of indirect network effects. As z i.e cross-elasticity for network effects increases, the strength of indirect network effects increases. As a result, the prices for higher elastic product decrease more than that of the prices for lesser elastic market. Hence, the difference between these curves increases as z increases

2.

a. Let k be the number of edges connected to a node, and let f(k) be the frequency of k. Research shows that f(k) follows $1/K^2$. This is called power law. For example, movies that have low reviews are many but the ones with good reviews are less. And one is more likely to watch a movie with a good review than the others. Thus, a node is likely to connect to a node with higher popularity, this is known as preferentaial attachment. Preferential attachment leads to power laws. Hence, popularity in social networks typically follows a power law.

b. As shown in the figure below, the network has nodes A, B, C, D, E, F, G where the solid edges represent whether the nodes are friends with each other. Since B is a common friend of A and E, B is likely to introduce A and E to each other. Similarly, E is likely to introduce B and C to each other and F and G to each other. Thus two people who have a common friend are likely to get connected to each other using some social mechanism. It’s relatively difficult for D and F to connect with each other. Hence, the networks tend to exhibit traidic closure that leads to forming of clusters.



c. Nodes are highly likely to connect to nodes that are closer to them, hence networks generally have small diameters. It means that the information follows through among objects quickly in the network and reaches from one node to another easily. With social networking sites and newer technologies, people are closer to each other than otherwise, hence every network tends to have a very small diameter. These networks typically represent small worlds due to their small diameters.