Strategy: An Introduction to Game Theory
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Lecture – 36

Hello, welcome to another module in this online course Strategy, An Introduction to Game Theory. So, we are looking at the basil yield versus fight game and we have computed the average payoffs of player 1, corresponding to the strategy combinations F Y and F F of player 2. And what we said is we do not need to compute the average payoffs of player 1, corresponding to the strategy combinations by F and Y Y of player 2, because for player 2 of type strong, Y is dominated by F. So, player 2 of type strong is never choosing F, never choosing Y in any Nash equilibrium of the game.

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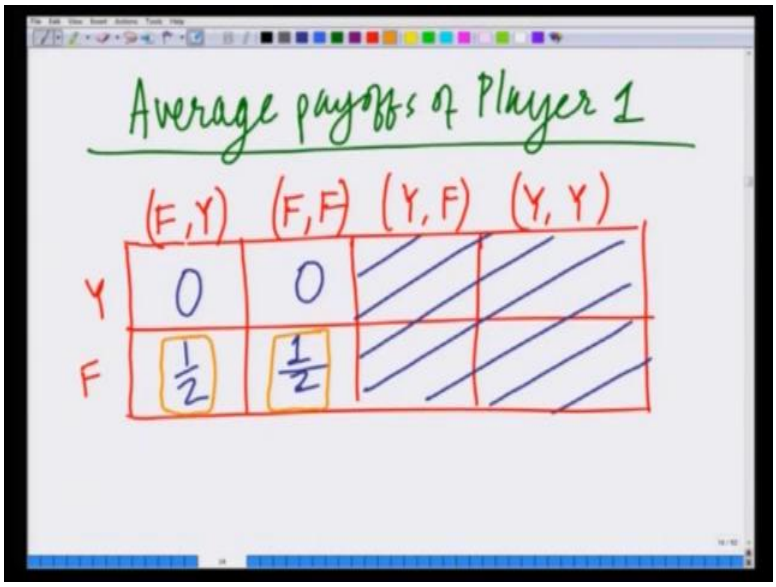

So, let us summarize the average payoffs of player 1. The average payoffs of player 1; let us draw single table for player 1; that we are drawn in the battle of sexes game. There are four combinations of strategy combinations for player 2; that is F comma Y, F comma F, Y comma F and Y comma Y and for actual choice is Y and F of player 1 and what we have also said that player 2 of type strong is never choosing Y. So, we can ignore these two columns. We can ignore these two columns corresponding to Y F and Y Y.

Now, what is the average payoffs of player 1, when each chooses Y corresponding to F Y of player 2; that is player 2 of type strong, we just choosing F. Player 2 of type weak,

we choosing Y, we have already calculated that payoffs. That is we have said remember Y, player 1 choosing Y, player 2 choosing F Y, the average payoff to player Y, player 1 is 0, so this is 0.

What is the average payoffs of player 1 choosing F, player 2 choosing F Y. We are computed this also and we said player 1 choosing F player 2 choosing F Y, the average payoffs to player 1 is a half is equal to half. So, F comma F Y is half. Similarly, average payoffs to player 1 choosing Y and player 2 choosing F comma F, average player to player 1, average payoffs to player 1 is 0.

And again, average payoffs to player 1 who chooses F and player 2 who chooses F comma F; that is, if you look at this average payoffs to player 1, when you chooses F and player 2 of type strong and weak both choose F is again half. So, therefore, u 1 of F comma F comma F is half. So, these tables gives the average payoffs to player 1, corresponding to the various strategies of player 2.

And from this we can clearly see what the best responses are, well the best response if player 2 is choosing F comma Y, the best response of player 1 is to choose F, use F yields in a payoffs of half, Y yields in a payoff of 0. If player 2 is choosing F comma F, then the best response of player 1 is to again choose F, because F yield also a payoffs of half and Y yields also a payoff of 0.

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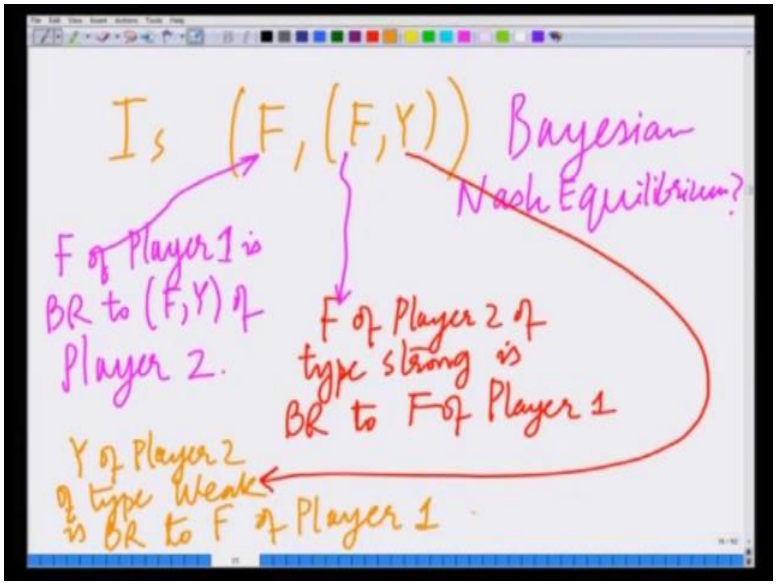

So, now we have to check, if F comma, F comma Y is a Nash equilibrium is, F comma F comma Y is this a Bayesian Nash, is this a Bayesian Nash equilibrium. Well, we have already seen F of player 1 is best response to F Y of player 2. So, F of player 1 is best response to F comma Y of player 2. How about F comma Y of player 2 to F of player 1? Well to look at that, let us go back to the game table.

If player 1 is choosing F, then F of player 2 of type strong is indeed the best response to F of player 1 and again, if player 1 is choosing F, Y of player 2 of type weak is the best response to F of player 1. So, both we are saying is the following thing, if we look at this F; that is F of player 2 of type strong is best response to F of player 1 and also Y of player 2 of type weak is best response to F of player 1.

Therefore, each player is type of player 2 is playing is best response. So, player 1 is playing his best response with F to F Y of player 2. And player 2 of type strong is playing his a best response with F to F of player 1 and player 2 of type weak is also playing his best response with yield Y to F of player 1. So, with F Y player 2 of each type is playing his best response to F of player 1. Therefore, this is indeed a Nash equilibrium, because each player of each type is playing his best response.

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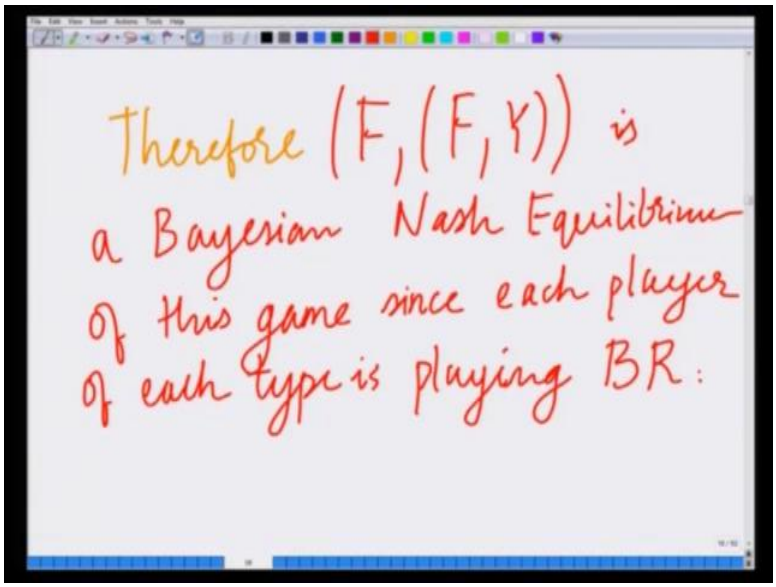

Therefore, F comma, F comma Y is a Bayesian is indeed at Bayesian Nash equilibrium of this game, since each player. So, F comma, F comma Y is a Bayesian Nash

equilibrium is indeed a Bayesian Nash equilibrium of this game. Since, each player of each type is playing best response.

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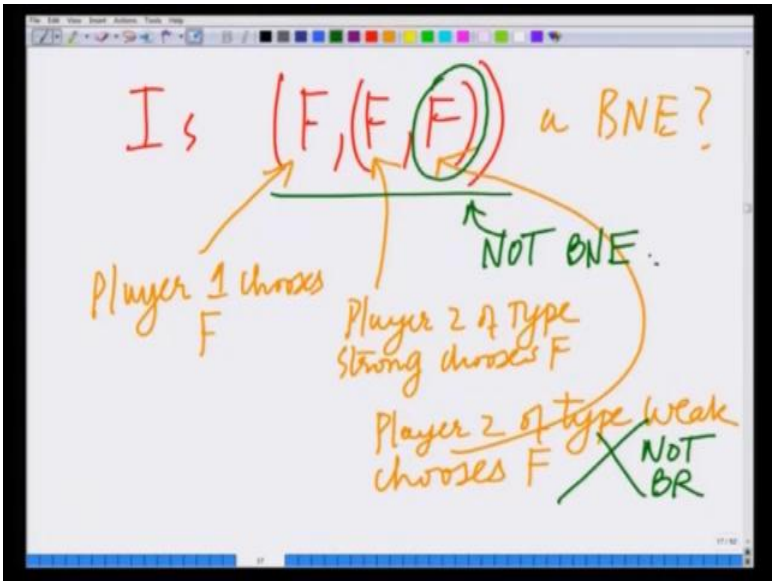

How about another possibility? Let us again look at this average payoffs of player 1, you can see F is the best response to F comma F of player 2. Can we check, if F comma F, can we ask the same question is F comma, F comma F, a B N E; is this is a B N E. That is player 1 is choosing F, chooses F player 2 of type strong and player 2 of type weak, chooses F is this a Bayesian Nash equilibrium. There player 1 is choosing F, there is to fight, player 2 of type strong is choosing to fight and player 2 of type weak is choosing to fight.

Then, we have already seen that F of player 1 is a best response to F F of player 2, but when player 1 is choosing F, while F of player 2 of type strong is the best response to F of player 1. However, Y is the best response to F of Y of player 2 of type weak is a best response to player 1 to F of player 1, F of player 1. So, F of player 2 of type weak is not the best response to F of player 1.

So, if we go back here ((Refer Time: 10:18)) we can see that this part, this that is F of player 2 of type strong, type weak, F of player 2 of type weak is not a best response to F of player 1. So, this F, so this condition is not a best response; that is when player 1 is choosing F, F of player 2 of type weak is not a best response is best response is to choose Y. Therefore, F comma, F comma F, where player 1 is choosing F, player 2 of each type

is also choosing fight or F is not. So, this is not B N E, so the only became B N E a Bayesian Nash equilibrium of this game is F comma, F comma Y.

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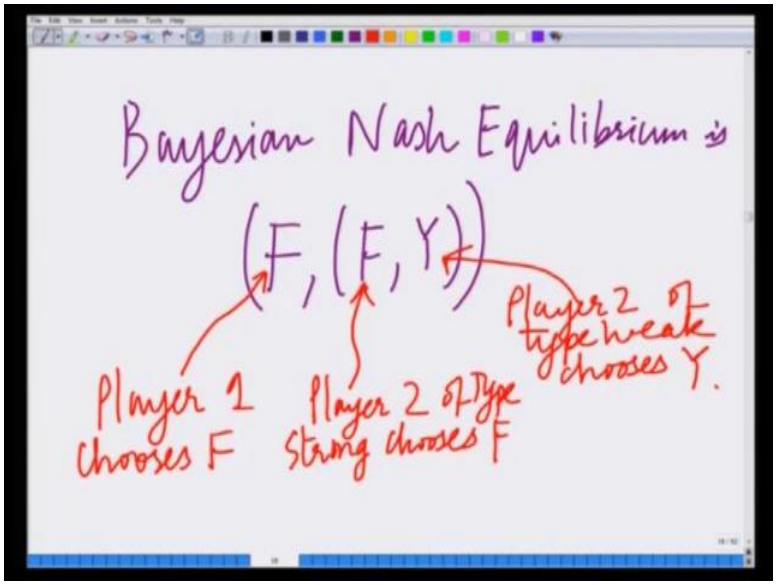

So, B N E a Bayesian Nash equilibrium, so Bayesian Nash equilibrium is indeed F comma Y, where player 1 is choosing F and player 2 of type strong chooses F and player 2 of type weak chooses Y. So, only Bayesian Nash equilibrium of this game is F comma F comma Y, where type player 1 is choosing F, player 2 of type strong is choosing F and player 2 of type weak is choosing Y. So, this is the Bayesian Nash equilibrium of this game.

So, what we have done in this module, we have looked another example of Bayesian game; that is yield versus fight game in which there are two players player 1 and player 2, who are involved in a confrontation. Each can choose action; that is to yield or fight; however, there is a certainty, there are in the type of player 2, player 2 can be of type yield or player 2 can be of type strong or he can be of type weak.

And therefore, we have derived the Bayesian Nash equilibrium of this game as F comma F comma Y, where player 1 is choosing F; that is to fight. Player 2 of type strong is choosing fight, at player 2 of type weak is choosing yield or what the way from that and this we said is the Bayesian Nash equilibrium, because we justified this as saying that each player of each type; that is player 1 and player 2 of both types are playing their best

responses. Therefore, this is the Bayesian Nash equilibrium of the game, hope this clarifies the idea of the Bayesian Nash equilibrium.

Thank you. Thank you very much.