Computational Problem Set Writeup

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Problem 1

Figure 1: Utility Function 1

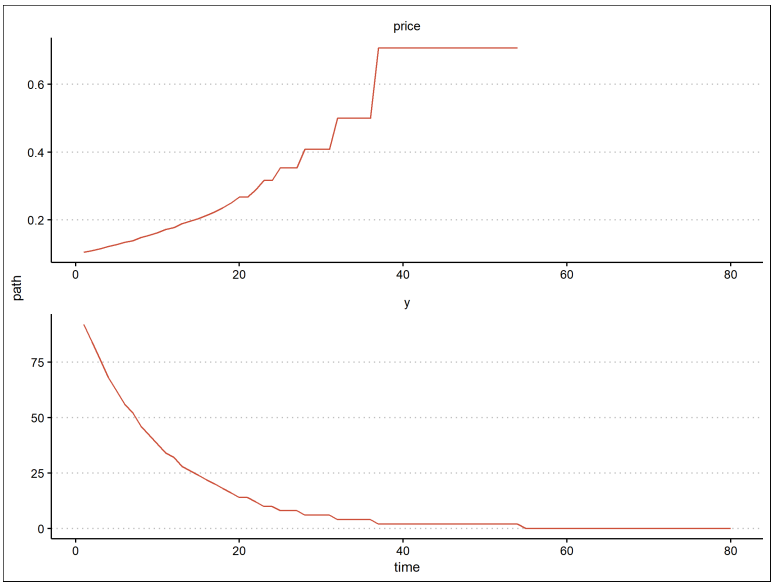
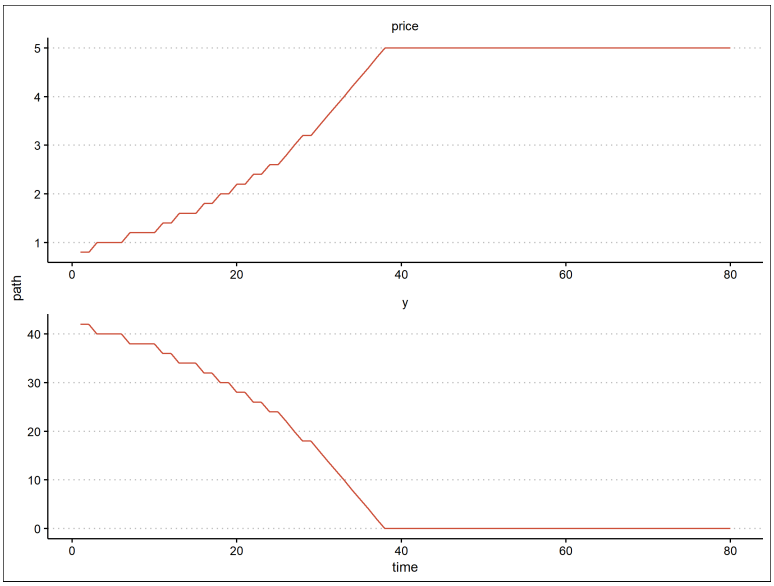


Figure 2: Utility Function 2



Problem 2

Figure 3: Interpolation Method: Utility Function 1

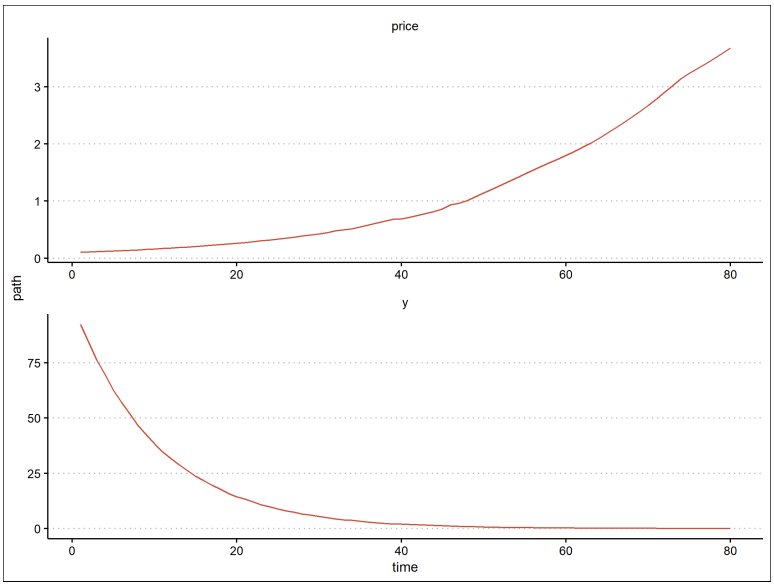
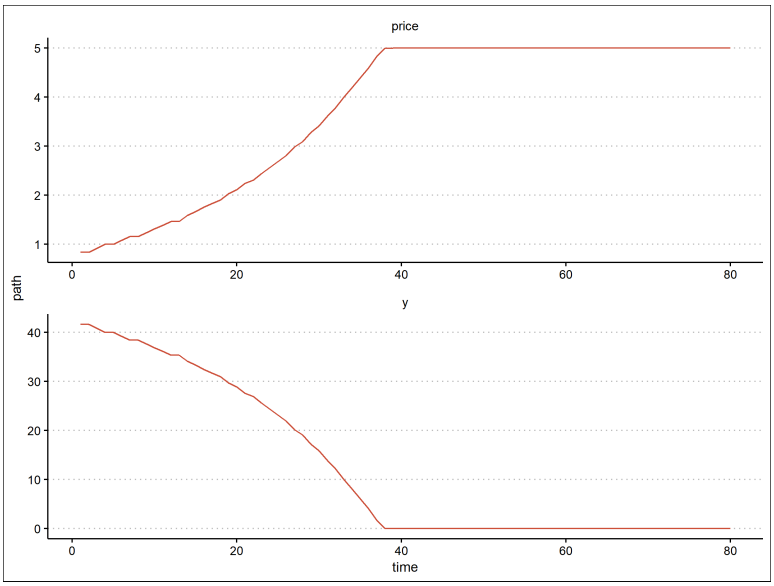


Figure 4: Interpolation Method: Utility Function 2



Problem 3

We see that the value function starts out convex in price, reflecting the fact that we can learn from observing what happens each period. This "real option" allows us to adapt our behavior to increase our potential upside from investment/drilling, which is why the trigger price exceeds $30. At higher prices, there's less uncertainty, since the standard deviation is now a smaller proportion of the price, making the option value less valuable. Once we hit the trigger price of $41, the value function becomes linear because there is no more value in learning, and everyone immediately drills at that price, so the profit is the linear function given.