**Exercise 1**. Show that the optimal extraction path is decreasing in time. Further show that the competitive market's optimal extraction path is steeper compared to the monopoly extraction path.

Use the equation for optimal extraction path

Take the derivate with respect to time to get

This is always negative and therefore we can conclude that the optimal extraction path of the competitive market is decreasing in time

For the monopoly we obtain similarly

Comparison

Conclusion: Extraction rate decreases faster in the case of competitive market as compared to the monopoly