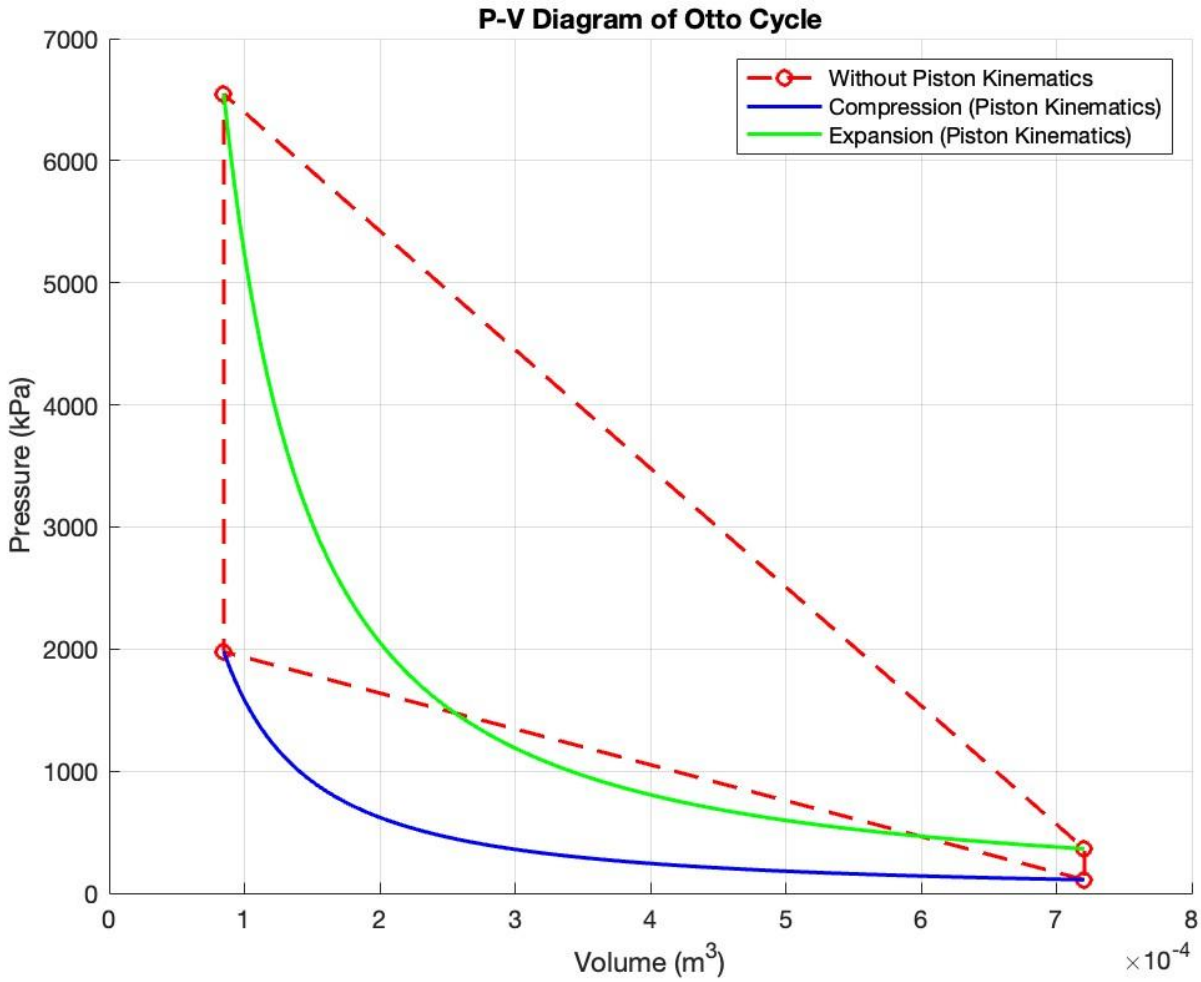
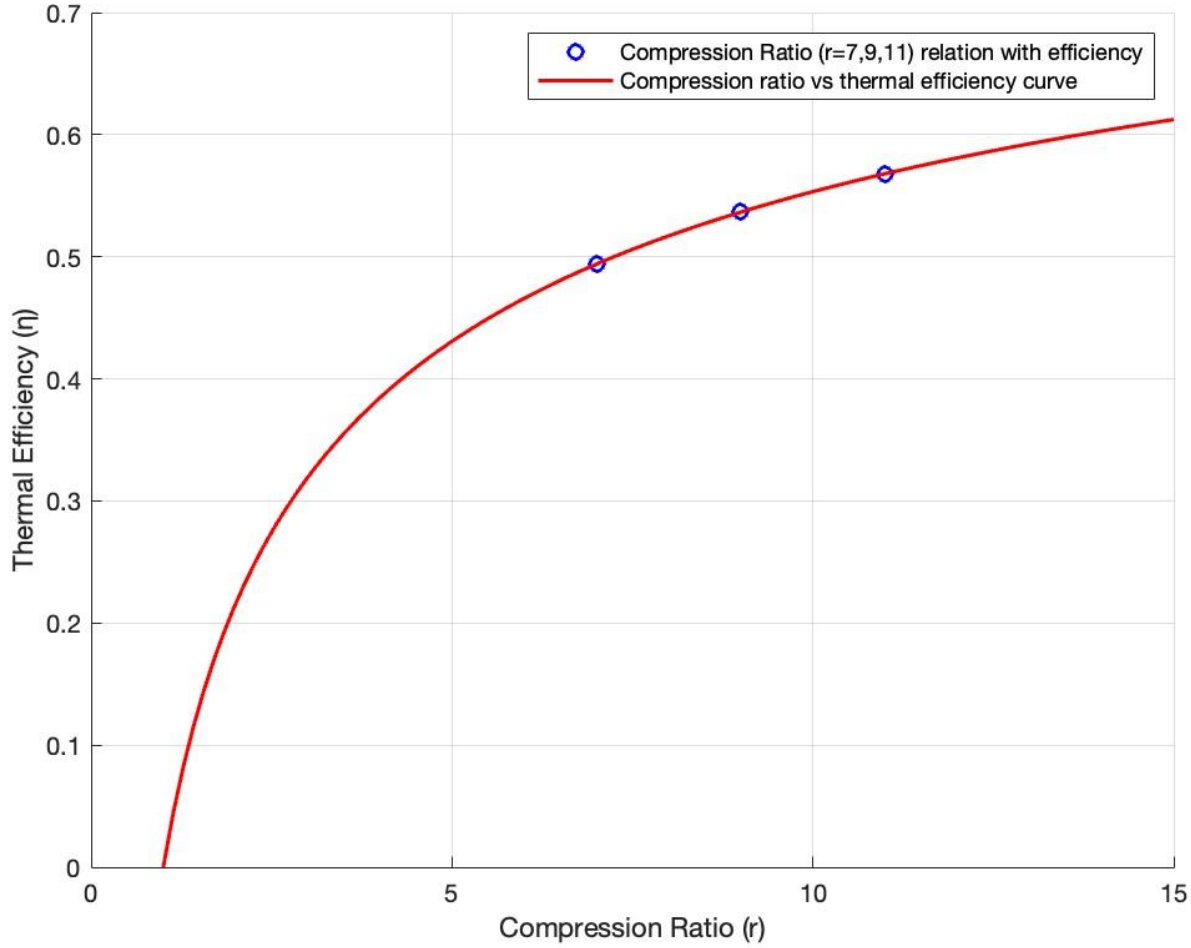
Question 2 (Assignment 2)

Observations/Inference Observed and comparing the results



- Using piston kinematics function gives a better overview of otto cycle, giving *better results* for thermodynamic relations like work etc.
- As seen, curve made without piston kinematics do not obey the conditions of the processes. Like process 1-> 2 is an adiabatic process (isentropic and reversible) but is shown by a straight line.
- Curve sketched by using piston kinematics obeys the conditions of the processes. Like process 1 -> 2 clearly depicts the adiabatic process (isentropic and reversible).
- If we obtain results for thermal efficiency, it comes out to be ***same*** from both the curves, as thermal efficiency depends on compression and expansion volume, which has been given in the problem.
- The state variables (pressure, temperature and volume) obtained without piston kinematics function is ***same*** as the state variables obtained with piston kinematics function.



- For r between 7 and 9, the thermal efficiency curve is steeper than the flatten curve after 9.
- So, basically at higher compression ratios, increase in thermal efficiency is ***negligible***, and for compression ratios between 7 to 11, is more feasible, as temperature of air fuel mixture is lower than the autoignition temperature of the fuel.