Stanford CME 241 (Winter 2021) - Assignment 7

Assignments:

1. Derive the solution to Merton's Portfolio problem for the case of the $\log(\cdot)$ Utility function. Note that the derivation in the textbook is for CRRA Utility function with $\gamma \neq 1$ and the case of the $\log(\cdot)$ Utility function was left as an exercise to the reader.

2. One of the reasons the backward induction solution in rl/chapter7/asset_alloc_discrete.py is slow is that we work with a generic Distribution type for risky_return_distributions , which means we have to sequentially sample from it to create the states distribution (in method get_states_distribution) that can be passed as input to back_opt_qvf. Modify the code to create a special type of distribution for the returns of the risky asset so we have a direct way of obtaining the probability distribution of the risky asset price at any time step (and hence, the probability distribution of wealth at any time step). With a direct way to obtain probability distribution of states at any time step, we can speed up the code considerably.