Portfolio Management using Partially Observable Markov Decision Process

Ramin Zahedi and Edwin K. P. Chong
Electrical & Computer Engineering
Colorado State University

Definitions
- \( p_i \): Price of stock \( i \) on day \( k \)
- \( n_i \): Number of shares for stock \( i \) on day \( k \)
- \( r_i \): Expected return of stock \( i \) on day \( k \)

Dynamics of the problem
- Observe the new prices: \( p_i \)
- Choose a candidate action: \( a_i \)
- Buy and Sell stocks based on the decision: \( r_i \)
- Compute the wealth for the next day: \( W_{i+1} = W_i + r_i \)

Rollout approximation

Exact solution for the POMDP problem

Preliminary results

References