

Extra Bonus 3 (5%)

Implement the least-squares Monte Carlo simulation to value American-style plain vanilla puts, lookback puts, and arithmetic average calls.

- Inputs for plain vanilla puts: $S_0, K, r, q, \sigma, T, n$.
- Inputs for lookback puts: $S_t, r, q, \sigma, t, T, n, S_{\max,t}$.
- Inputs for arithmetic average calls: $S_t, K, r, q, \sigma, T - t, M, n, S_{\text{ave},t}, \text{passing_time}$.
- Outputs: Option values and 95% confidence intervals.