

**Problem Set 2**

Due at classtime, Thursday 25 Sep 2003

Problem sets should be your own work. Please hand in listings of any MATLAB programs used to generate the answers to these problems.

1. Consider the asset–replacement–with–maintenance problem presented in demo program demddp03.
  - a. In comparison to the baseline, determine the threshold cost of servicing which makes it optimal never to service the asset during its life.
  - b. In comparison to the baseline, determine the threshold replacement cost which makes it optimal to replace the asset every year.
2. Consider the binomial option pricing model presented in demo program demddp04.
  - a. In comparison to the baseline, show how lengthening the term of the option ( $T$ ) will affect the option premium, or fair price.
  - b. In comparison to the baseline, show how increasing the volatility of the underlying asset price ( $\sigma^2$ ) will affect the option premium, or fair price.
  - c. Redo the baseline case for an American call option rather than an American put option, and discuss how the results differ.
3. Consider the industry entry/exit model presented in sections 8.3.2 and 9.6.2. Run the baseline model (demdp02).
  - a. What would be the effect of raising the cost of exit from 5 to 25 units? Explain this result, and relate it to legislation that prevents money–losing firms from shutting down, laying off workers, etc.
  - b. Compared to the critical decision values of the original model, what would be the effect of raising the cost of entry from 10 to 100 units? Explain this result, and relate it to “barriers to entry” that may make it difficult for new contestants to compete with established firms.
  - c. Compared to the critical decision values of the original model, what would be the effect of setting parameter  $\bar{\pi}$  to 2.0? Explain the workings of the autoregressive scheme that governs short–run profit, and discuss how positive long–run profits affect the critical decision prices in the problem.