1023-49-1196   **Warren Powell*** (`powell@princeton.edu`). *Approximate Dynamic Programming for Military Applications.* Preliminary report.

There are many applications in military analysis where we need to model rational (perhaps even intelligent) decisions in dynamic settings. We may be interested in obtaining the best possible decisions (optimizing), but we may be simply interested in good decisions without having to tune a lot of rules. This talk is designed as an introduction to the field of approximate dynamic programming which uses the idea of iteratively simulating a system while learning from past mistakes. By combining classical concepts of optimization and simulation, we produce a technology that we often refer to as an "optimizing simulator." It possesses the power and flexibility of simulation, with the intelligence of optimization. The optimizing behavior has allowed us to obtain realistic simulations with minimal tuning of rules, while producing realistic decisions that reflect the dynamics and uncertainties of real-world conditions. The ideas will be illustrated using military applications such as military airlift and mid-air refueling. (Received September 25, 2006)