

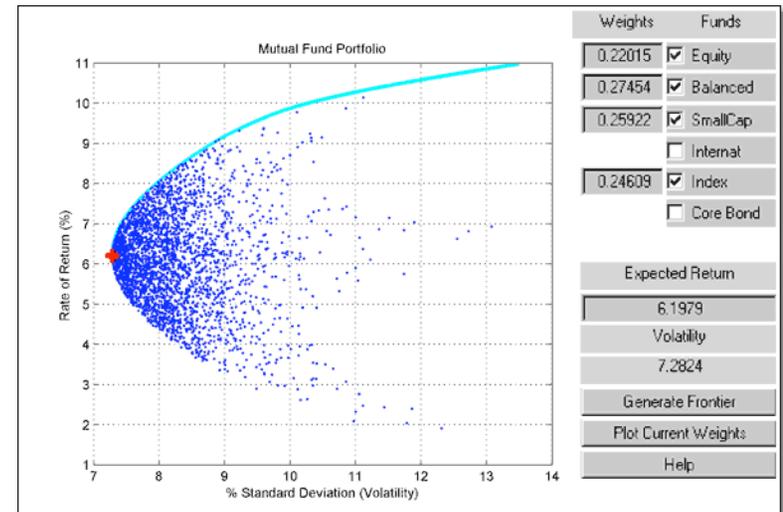
Lecture 2: ***Introduction to Matlab***

COSMOS - Making Robots and
Making Robots *Intelligent*

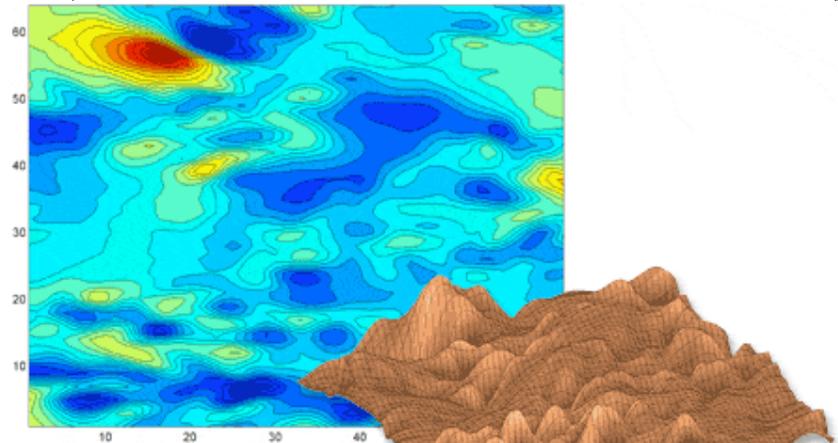


Graphing Calculator on Steroids

Optimization & Financial Toolboxes are used to create a GUI-driven program that optimizes a portfolio of mutual funds.



MATLAB is used to visualize the chaotic motion in fluid with both surface and contour plots.



Images and text courtesy of Mathworks site:
http://www.mathworks.com/applications/tech_computing

Plotting Functions for Testing Control

Model of “Bob”:

$$mv_{k+1} = mv_k + \Delta[-bv_k + u_{eng} + u_{hill}]$$

Control: $u_{eng} = K(v_{des} - v_k), \quad K > 0$



Look at response for $k = 0, 1, 2, \dots$ given some v_0

$$v_{k+1} = v_k + \frac{\Delta}{m}[-(b + K)v_k + Kv_{des} + u_{hill}(t_k)]$$

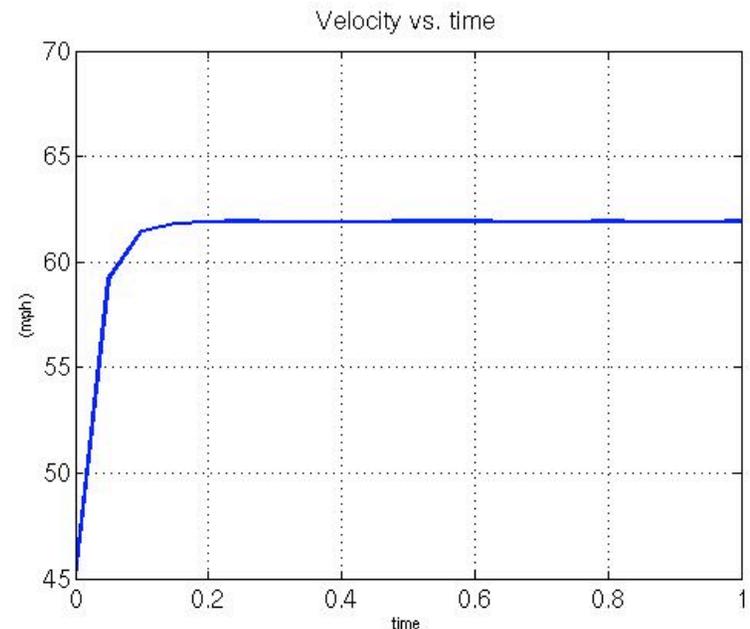
Plot velocity versus time

$$t_k = k * \Delta$$

Starts at 45mph, want 65mph in presence of random noise

$$\Delta = 0.05, \quad m = 5$$

$$b = 1, \quad K = 20$$



6/27/05

COSMOS - Making
Intelligent

Objective

- Learn basic Matlab function commands
- Creating Matlab function files
- Where to save files
- Plotting output response of model (as on slide 3).