

Introduction to Multi-Agent-Programming

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Exercise Sheet 4

Due: December 14, 2010

Exercise 4.1 (Kalman filter (10 pt))

Consider the problem of determining the current hitpoints of a civilian, even it is currently not seen. Civilians have hitpoints greater 0 (unless they are dead) and damage ≥ 0 . In each round each civilian loses damage hitpoints, i.e. $hp_{t+1} = hp_t - damage_t$. Damage changes randomly with zero mean.

Agents can observe (noisy) measurements of a civilian's (hp, damage), if they see them.

- (a) Formulate a transition model to be used by a Kalman Filter for the description above. Hitpoints and damage should be tracked as a two-dimensional hidden state. Put the formulalization in the code's documentation.

Formulate the problem linearly, i.e. in matrix form and not as a function. (The problem is linear, so no linearisation needs to be performed).

- (b) Implement the kalman filter in the Ex04KalmanFilter class. Each civilian should be tracked by its own Kalman Filter.