Problem Set 6

Cristian Rodriguez

a) The input (action) space of the state estimator system is based on the belief state. All states, however, allow all actions since you always have some probability of believing you are in any state.

b) The bayes filter takes N_s^2 steps to calculate the Bel^-_{t+1} factor, and N_s steps to calculate the Bel^+_t factor. The particle filter then takes N_s steps, if every particle corresponds to 1 state. However, computation power is wasted if a particles weight is 0 for the particle filter.

c)

$$V^*(b) = \max_{a \in A} \left[r(b,a) + \gamma \sum_{o \in \Omega} pr(o|b,a) V^*(\tau(b,a,o)) \right]$$

where τ is the belief state transition function

$\Rightarrow$ The reward now becomes the expected reward

d) Yes.