

In the name of Allah
Fuzzy control: Midterm Exam

Quchan University 1394/10/01

Time: 24 Hours

Simulation	7
Score	5

Question 7: Consider the truck backer upper control system problem in section 12.3

a) Simulate $x(t)$, $y(t)$ and $\phi(t)$ by following equations:

$$x(t+1) = x(t) + \cos[\phi(t) + \theta(t)] + \sin[\theta(t)]\sin[\phi(t)]$$

$$y(t+1) = y(t) + \sin[\phi(t) + \theta(t)] - \sin[\theta(t)]\cos[\phi(t)]$$

$$\phi(t+1) = \phi(t) - \sin^{-1}\left[\frac{2\sin(\theta(t))}{b}\right]$$

- b) Design a fuzzy controller for self-parking the truck from initial state $(x_0, \varphi_0) = (0, 90^\circ)$ to the final state $(x_f, \varphi_f) = (10, 90^\circ)$
- c) Repeat your simulation from the initial state $(x_0, \varphi_0) = (-3, 90^\circ)$.

Send your simulations with comment on the results in m file via email, up to 24 hours from the 12 am Saturday 5/10/94.

Be successful
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