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Implementation of fuzzy logic control system on rotary car parking system prototype (Article)

Ismail, N.[a] ✉,   Nursalim, I.[a],   Saputra, H.M.[b],   Gunawan, T.S.[c]   👤

[a]Electrical Engineering Department, Faculty of Science and Technology, UIN Sunan Gunung Djati, Jalan A.H Nasution 105, Bandung, Indonesia
[b]Research Center for Electrical Power and Mechatronics, Indonesian Institute of Sciences, Jl. Cisitu No.21/154D Sangkuriang, Bandung, 40135, Indonesia
[c]Electrical and Computer Engineering Department, Kulliyyah of Engineering International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, 53100, Malaysia

Abstract   ⌄ View references (19)

Rotary car parking system (RCPS) is one of the effective parking models used in the metropolitan area because the mechanical parking system is designed vertically to conserve the land usage. This paper discussed the implementation of fuzzy logic with the Sugeno Inference Model on the RCPS miniature control system. The research started with kinematics analysis and a mathematical model was derived to determine the slot position and optimal power requirements for each condition. Furthermore, the Fuzzy Inference model used was the Sugeno Model, taking into account two variables: distance and angle. These two variables were selected because in the designed miniature RCPS there will be rotational changes of rotation and rotation in turn. Variable distance was divided into four clusters, such as Zero, Near, Medium and Far. While the angle variables were divided into four clusters as well, such as Zero, Small, Medium, and Big. The test results on a miniature RCPS consisting of six parking slots showed that fuzzy based control provided better results when compared to conventional systems. Step response on the control system without fuzzy control showed the rise time value of 0.58 seconds, peak time of 0.85 seconds, settling time of 0.89, percentage overshoot of 0.20%, and steady state error of 4.14%. While the fuzzy control system provided the rise time value of 0.54 seconds, settling time of 0.83 seconds, steady state error of 2.32%, with no overshoot. © 2018 Institute of Advanced Engineering and Science. All rights reserved.

Author keywords

(Control) (Fuzzy logic) (Kinematic) (Rotary car parking system)

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