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Title:
Discrete-Time Linear System of New Series Motor Four-Quadrant Drive Direct Current Chopper Numerically Represented by Taylor Series: Part 1: Driving Mode Operation

Journal:
Advanced Structured Materials, Volume 131, 2020

Document Type:
Book Chapter

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Full text link:
Publisher: Springer

Scopus preview
https://www.scopus.com/inward/record.uri?eid=2-s2.0-85086091152&doi=10.1007%2f978-3-030-46036-5_10&partnerID=40&md5=9a17ae44200cfdd0715ed31efb3493df

Citation:
Arof, S., Sukiman, E.D., Diyanah, N.H.N., Noor, N.M., Noorsal, E., Mawby, P., Arof, H. Digital Proportional Integral Derivative (PID) Controller for Closed-Loop Direct Current Control of an Electric Vehicle Traction Tuned Using Pole Placement (2020) *Advanced Structured Materials*, 131, pp. 101-112. DOI: 10.1007/978-3-030-46036-5_10

Abstract:
This paper proposes a numerical method using Taylor series in representing a new series motor of a four-quadrant drive direct current chopper (FQDC) in driving mode operation for electric vehicle's application. The representation has three main purposes which are for troubleshooting, error correction and optimization. The Taylor series will be used to imitate the real system of a FQDC, but it is running in an embedded system such as a PIC microcontroller. Through this representation system, we can do a fault diagnose, error correction and system tuning without disturbing the real system on running. Once the optimization via representation is obtained, it can be applied to the real system. The representation system using Taylor series is tested using MATLAB/Simulink. The simulation results using MATLAB/Simulink show that the Taylor series computation algorithm successfully represents the FQDC in driving mode.