Automatic Train Control based on the Multi-Agent Control of Cooperative Systems

Ali Siavashi1,*, Bijan Moaveni2

School of Railway Engineering, Iran University of Science and Technology, Tehran, Iran, ali_siavashi@rail.iust.ac.ir
School of Railway Engineering, Iran University of Science and Technology, Tehran, Iran, b_moaveni@iust.ac.ir

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Abstract

The growing traffic intensity and complexity of the railway systems as well as the demand for higher speed need to new Automatic Train Control (ATC) methods. The conventional ATC system has some problems and in recent years new ATC methods like the Decentralized ATC (D-ATC) and autonomous decentralized ATC are developed which have some advantages. In this paper, an Intelligent Decentralized ATC (ID-ATC) approach based on the Multi-Agent systems theory is developed which can provide high transportation capacity, high-safety and high-reliability. In this method we combine the Voronoi concept of cooperative systems theory with Multi-Agent control theory by using of fuzzy control logic. The control algorithms are presented and by using of simulation results the effectiveness of the method is demonstrated.

Keywords: Automatic Train Control, Multi-Agent Control Systems, Cooperative systems, Fuzzy control, Voronoi Algorithm.

1,* Corresponding author: M.Sc. Student of Electrical Railway Engineering, School of Railway Engineering, Iran University of Science and Technology (IUST), Tehran, Iran, +98-21-77209041
2 Assistant Professor, PhD of Control Systems Design. He is with School of Railway Engineering, Iran University of Science and Technology (IUST), Tehran, Iran, +98-21-77209041