TRAINER DIFFERENSIAL ELEKTRONIK PADA MOBIL LISTRIK MENGGUNAKAN SISTEM KENDALI FUZZY NEURAL NETWORK HARRIS HAWK OPTIMIZATION

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ABSTRACT

In the era of the Industrial Revolution 4.0, electric vehicles have become an attractive trend and have an increasing market because of the ever-increasing performance. One solution is to have an electronic differential to eliminate friction. This study aims to design an electronic differential learning trainer on an electric car using an adaptive Fuzzy Neural Network Harris Hawks Optimization (HHO) control system. The fuzzy control system is proposed because it has the advantage that it can imitate human thought patterns with its IF-THEN thinking. The HHO algorithm was chosen to improve fuzzy control performance and is the latest heuristic algorithm that offers advantages in the control system. By combining these algorithms, the Trainer design is useful for adding knowledge to learning and getting research targets. The mathematical model of the wheel control system was created using MATLAB Simulink with the appropriate parameters. The goal is to get a system that is as close to real as the vehicle in actual conditions. With these parameters, a mathematical model can be created and produce test outputs that are close to an actual vehicle. With the proposed algorithm, electric vehicles that use 4 different driving motors can be controlled using wire or steer by wire efficiently. This is due to the lack of mechanical friction in the vehicle because the wheels are not connected using mechanics like conventional vehicles.

Kata Kunci: *Electric Vehicle, Electronics Differential, Fuzzy Neural Network, MATLAB Simulink*