

# APPLICATION OF ARTIFICIAL NEURAL NETWORKS IN PREDICTION OF COMPRESSION IGNITION ENGINE PERFORMANCE AND EMISSION PARAMETERS

<sup>1</sup>İHSAN ULUOCAK, <sup>2</sup>SEFA YILDIRIM, <sup>3</sup>HAKANYAVUZ, <sup>4</sup>ERDI TOSUN

<sup>1,3,4</sup>Cukurova University, <sup>2</sup>AlaaddinKeykubat University,

E-mail: <sup>1</sup>ihsanuluocak@gmail.com, <sup>2</sup>sefa.yildirim@alanya.edu.tr, <sup>3</sup>dr.hakanyavuz@gmail.com, <sup>4</sup>etosun@cu.edu.tr

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Nowadays, artificial intelligence (AI) techniques are commonly used instead of time consuming and costly experimental labor works. Especially, artificial neural networks (ANN) which are inspired from biological neural networks are prominent among the other types of AI. In our study, ANN is used to estimate the characteristics of a four-stroke single cylinder compression ignition engine such as performance and emission parameters. The engine was fueled with biodiesel-diesel mixtures. The input parameters of ANN are blend ratio and engine speed while the output parameters to be estimated are torque, power and CO, CO<sub>2</sub>, NO<sub>x</sub> values. The main architecture of ANN was consisted of three layers, namely; input, hidden and output. Levenberg-Marquardt back-propagation training algorithm was used for weight and bias updates. MAPE and R<sup>2</sup> were used as performance evaluation criteria. Finally, it can be concluded that, ANN has considerable prediction capability of the values with an acceptable accuracy and it can be suggested for the further estimations of engine parameters instead of time consuming and costly experiments.

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