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APPLICATION OF A NEURO-GENETIC TECHNIQUE IN THE OPTIMIZATION OF HEAVY METALS REMOVAL FROM WASTEWATERS FOR ENVIRONMENTAL RISK REDUCTION

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Abstract

The reason for carrying out this research is related to the significant risk of heavy metals present in wastewater on the environment and human health. The removal of heavy metal ions from aqueous solutions was performed in a batch system, using peat (from Poiana Stampei, Romania) as adsorbent. The efficiency of the process was predicted with high accuracy (correlation with experimental data more than 0.99) based on a feed-forward neural network with two hidden layers. The neural network combined with a classical genetic algorithms have constituted the methodology applied for obtaining optimal working conditions (temperature, contact time, initial concentration of heavy metal ions, solution pH, and adsorbent dose) which lead to maximum efficiency. Important information for experimental practice are obtained, proven through the validation phase of the optimization procedure.

Key words: genetic algorithm, heavy metals, neural network, optimization, peat

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