# Auto-control technique using gradient method based on radial basis function neural networks to control of an activated sludge process of wastewater treatment

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**Abstract:** Dissolved oxygen (DO) concentration is a key variable in the activated sludge wastewater treatment processes. In this paper, an auto control strategy based on Euler method and gradient method with radial basis function (RBF) neural networks (NNs) is proposed to solve the DO concentration control problem in an activated sludge process of wastewater treatment. The control purpose is to maintain the dissolved oxygen concentration in the aerated tank for having the substrate concentration within the standard limits established by legislation of wastewater treatment. For that reason, a new proposed control strategy based on gradient descent method and RBF neural network has been used. Compared with RBF neural network PI control, the obtained results show the effectiveness in terms of both transient and steady performances of proposed control method for dissolved oxygen control in the activated sludge wastewater treatment processes.

**Keywords :** activated sludge process, Wastewater treatment, Gradient descent algorithm, RBF neural network, PI control