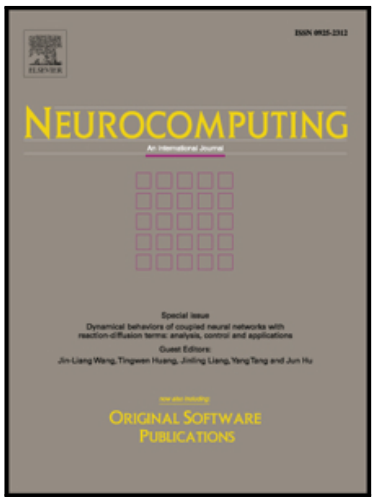

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Abstract: Optimization problems often require the use of optimization methods that permit the minimization or maximization of certain objective functions. Occasionally, the problems that must be optimized are not linear or polynomial; they cannot be precisely resolved, and they must be approximated. In these cases, it is necessary to apply heuristics, which are able to resolve these kinds of problems. Some algorithms linearize the restrictions and objective functions at a specific point of the space by applying derivatives and partial derivatives for some cases, while in other cases evolutionary algorithms are used to approximate the solution. This work proposes the use of artificial neural networks to approximate the objective function in optimization problems to make it possible to apply other techniques to resolve the problem. The objective function is approximated by a non-linear regression that can be used to resolve an optimization problem. The derivate of the new objective function should be polynomial so that the solution of the optimization problem can be calculated.

Keywords: neural networks, optimization problems, non-linear optimization.

1 Introduction

Optimization problems are an important part of soft computing, and have been applied to different fields such as smart grids [1], logistics [2] [3], resources [4] or sensor networks [5]. Such problems are characterized by the presence of one or more objective maximizing or minimizing