

Convergence of Symbolic Regression using Metaheuristics

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Abstract

Simulation offers key insights into the behavior of real world processes. The ever increasing complexity of simulation models limits simulation by its significant computational cost. A surrogate model approximates the responses of a simulation model at a lower computational cost. Symbolic Regression (SR) is an interesting combination of a discrete combinatorial and continuous optimization problem, it is capable of evolving analytical expressions as surrogate models. The chief advantages SR offers in comparison to other surrogate techniques are transparency and insight into the dynamics of the feature set. Convergence and accuracy are open problems in SR. There is a need for an algorithm capable of handling both the discrete and continuous aspects of the problem with a good rate of convergence and accuracy. Advances in the field of metaheuristics warrant an in depth study into the applications of these algorithms to the SR problem. Our approach is a hybrid of a combinatorial algorithm and an optimization algorithm. The change in rate of convergence of several strategies will be analyzed and compared against the change in computational cost.