DESIGN AND REVIEW OF OPTIMIZATION USING EVOLUTIONARY ALGORITHMS

K.Bharathi
Department of Mathematics,
Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya, Kanchipuram.
03bharathi@gmail.com

C.Vijayalakshmi
SAS, Mathematics Division, VIT, Chennai
vijayalakshmi.c@vit.ac.in

Abstract: The applications of Evolutionary Algorithms in Multi Objective Optimization are currently receiving growing interest from researchers with various backgrounds. Most research in this area has understandably concentrated on the selection stage of Evolutionary Algorithms, due to the need to integrate victories performance measures with the inherently scalar way in which Evolutionary Algorithms reward individual performance. In this review work, current multi objective evolutionary approaches are discussed, ranging from the conventional analytical aggregation of the different objectives into a single function to a number of population based approaches.

Keywords: Algorithms, Evolutionary Algorithm, Multi-Objective Optimization Problem, Pareto Evolutionary Model, Travelling Salesman Model.

1. Introduction: Evolutionary algorithms (EAs) are the machine learning approaches from natural collection in the biological world. EAs vary from more established optimization techniques, where EAs involve a set of solutions called population. The iterations of an EA involve an aggressive selection that includes feasible solutions. The set of solutions where operated by using one are more operations to get a best optimal solution. If we have more than one criterion to be optimized with several conditions said to be constraint equation such a problem is named as Multi-objective optimization.

A computational model is a mathematical object representing a collection of questions that might be able to solve by a computer. It can be viewed as an infinite collection of instances together with solution for every instance. The calculations are to be done by taking a set of data as input, using the input values the operating machine can proceeds with its calculations and gives an acceptable solution set as output data. A finite sequence of states of a real values discretely distributed in time, the real values as an abstract computational model having a restricted rate of performance of the operations, a restricted number of digit places to form a number and a restricted storage capacity.

2. Evolutionary Models:

2.1 Pareto Evolutionary Models: Liu et al. (2014) have in detailed study about multiple optimality condition present in the model of structures of antenna model to get a feasible solution. By applying the evolutionary based iterative process for this multi criteria system running time of the modelled objectives present in the antenna were inter linked with the machine based stimulated values. Li, Zhang, Kwong, Li and Wang (2014) investigate the multi criterion decision model with Morkov condition applied in the technique of policy proceeded. They have applied an algorithm of evolutionary gradient conditions acted as a joint process so as to solve the modelled problem.

2.2 Multi Objective Models using Evolutionary Algorithms: Li, Deb, Zhang and Kwong (2015) designed an algorithm so as to balance the convergence and diversity points present in multi objective model evolutionary based approaches. The designed model of algorithm was applied on a multi criteria based with more than fifteen objective functions to be optimized simultaneously. The model balance the

point of convergence and diversity in the optimal value when compared with the existing classical methods to solve a multi objective optimization model. The results was compared with the traditional methods.

Mohammadi et al. (2014) proposed an algorithm of evolutionary preformed application with user method. This designed model of process was used in multi criteria optimality algorithms. Many real world modelled problems was communicated and the results were analyses. The implied algorithm was compared with existing models. Li, Kwong, Zhang and Deb (2015) addressed the sub problems present in multi optimal methods using inter relative preferences with involved solutions of the divisions. In all generated population solutions the methodology of the inter relative preferences was applied to get an optimality. By applying the proposed algorithm diversity of the solution is minimized with increased in solution convergence. The output was compare with empirical methods.

Wang et al. (2015) proposed a novel of two arch algorithms based on multi objective evolutionary approaches for multi model objective function. The design of two arch processes selects the different norms of pareto and indicator based operation models. Many benchmark problems was evaluated using two arch algorithm and the results were compared the traditional methods. Wang et al. (2016) applied constraint property to the sub problems decomposed from the evolutionary multi modelled optimization. The new applied constraints were evaluated by applying operators of evolutionary process and decomposed solution is derived. The new model was tested with the numerical examples with comparison.

Cheng, Olhofer and Jin (2015) proposed a articulation of reference based vector performance to the selected set of solutions from the pareto front approach. Here the selection of solution was done by the logical constraints created by the decision making process. By applying this method the convergence of the optimal results for the multi objective model was achieved. Bandyopadhyay and Mukherjee (2015) designed a new algorithm based on differential multi objective evolutionary models applications with additional technique. The process of checking convergence of optimality in every position of the flow is vital part. Many benchmark problems was evaluated using algorithm based on differential multi objective evolutionary models and the results were compared the traditional methods.

Cheng, Jin, Narukawa and Sendhoff (2015) modelled an non dominated solution in search of multi mode representation using construct process involving gaussian methods. An inverse model of gaussian process creates the new solution set for optimality. The proposed method run in an robust performance and give the optimality. The modelled algorithm was compared with existing models.

Zhang et al. (2018) proposed an innovative method of platform tension leg programming for multi modelled optimization techniques. The real world designed model of multi objective optimality process was developed and applied the proposed programming method. The results of applying innovating platform tension leg programming method was efficient enough by attaining the optimality criteria of the multi modelled process. This method reduces the dynamic model error values obtained in the classical methods. The proposed model was sufficient enough to attained the minimized total weight platform for the multi objective model.

Biswas et al. (2018) introduced an evolutionary modelled application of windfarm layout as a multi objective optimization method. Here the objectives are to minimize the maximum power out released by the wind in the layout and to minimize the structure of windfarm. The designed model applying evolutionary approach an efficient solution was obtained. Ramli et al. (2018) designed a multi objective model of solar energy power system and wind energy system to be optimized. By applying a self adaptive evolutionary differential method of algorithm to the proposed method an set of feasibility was obtained. The modelled problem was based on real world application of jobs with machines.

2.3 Travelling Salesman Model: Mohammadpour and Yadollahi (2014) worked based on two approaches of scheduling the salesman in appropriate places with many conditions involved. The

approaches was to fix the cites and visited of the salesman designed. By this method the multi valued variable was transformed to single objective model and genetic operators was introduced to attain optimality. The proposed model was tested with examples and compared. Nodehi et al. (2016) proposed a revised generation evolutionary services algorithm to solve a travelling salesman model. The model of heuristic approaches the nearest optimized solution to the complex model. The design of the algorithm was tested with numerical example.

Odili and Mohmad Kahar (2016) introduced a meta heuristic model of african buffalo optimality condition applied algorithm for travelling salesman approaches. The behavior of buffalo in forest was used as a inter linked step in the process of algorithm. Applying this methodology many real model of travelling salesman was solved.

Ponraj and Amalanathan (2014) and Bolan˜os et al. (2016) presented a changed genetic algorithm for the multi modelled travelling salesman. The refined selection of initial set population generating was implemented to the process. The proposed model was applied for many benchmark methods and compared with the existing algorithm.

Huang et al. (2014) describes an optimization process applied with graphics processing unit improved model to generate a good schedule for travelling salesman. The developed method was used to solve practical applied models and solutions were compared.

3. Conclusion: A multi-objective optimization problem has many complicated objectives with a set of Pareto optimal solutions. The way developed by set of solutions as population, evolutionary algorithms in multi- objective optimisation where estimates the Pareto optimal position. Here we deal with a general overview of Evolutionary algorithms to Multi objective optimizations in the past sixteen years. We have discussed the algorithms, methodology used, applied field and significant work where briefly given. Also the most delegate existing study trends were discussed, and provided the advantages present in using EAs in the different fields.

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