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DYNAMIC STRUCTURE-BASED NEURAL NETWORKS DETERMINATION FOR SIMULATION OPTIMIZATION

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Abstract. Simulation optimization studies the problem of optimizing simulation-based objectives. This field has a strong history in engineering but often suffers from several difficulties including being time-consuming and NP-hardness. Simulation optimization is a new and hot topic in the field of system simulation and operational research. This paper presents a hybrid approach that combines Evolutionary Algorithms (EA) with Neural Networks (NN) for solving simulation optimization problems. In this hybrid approach, we use NN to replace the known simulation model for evaluating subsequent iterative solutions. Further, we apply the dynamic structure-based neural networks to learn and replace the known simulation model. The determination of dynamic structure-based neural networks is the kernel of this paper. The final experimental results demonstrated that the proposed approach can find optimal or close-to-optimal solutions, and is superior to other recent algorithms in simulation optimization.
Keywords. simulation optimization, structure-based neural networks, genetic algorithms, structure determination, orthogonal genetic algorithm with quantization.
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1 Introduction

1.1 Scope and Structure

This paper concerns the determination of dynamic structure-based neural networks, specifically, as a method of simulation optimization. This paper is organized as follows. We first provide a general introduction, including background, a description of simulation optimization problems, and the strategy used in this study. The second section includes a literature review of areas important to the research, including: dynamic structure-based neural networks and neural networks structure determination. In the third section, a proposed approach to dynamic structure-based neural networks determination is discussed in detail. The fourth section, discusses the results of experiments performed to evaluate the proposed method. The fifth, and final, section is a summary and conclusion.

1.2 Background

Determining the best combination of variables to use as input for a simulation model is a common practical problem. The input values have to be chosen