ABSTRACT

Network-on-Chip (NoC) have been adopted as an interesting option in design of communication infrastructures for embedded systems or SoCs (System-on-Chip). These networks are structures that can be used in multiple SoC projects, each with different numbers of cores. NoCs provide a scalable system and balances the communication between cores. NoC-based projects aimed at implementing a specific application. In this context, design aid tools are essential. These tools are designed to, from a simple description of the application, perform successive optimization processes that will shape the various features of the system. These optimization algorithms are needed to meet a set of constraints, such as area, power consumption and execution time. Among these steps, can be included static routing. The routes through the network are optimized by minimizing the communication time and the packet transmission delays caused by congestion on the switches. In this dissertation, the ant colony optimization was used in the search of routes. This is a meta-heuristic inspired by ant behavior and is widely used in solving combinatorial optimization problems, such as searching in graphs . Multiple colonies was used in the proposed algorithms, each one responsible for the optimization of the path of one message. The simulations show the EAS-based routing achieving superior results in compare to other routing algorithms.

Keywords: Network-on-Chip. Routing algorithms. Ant Colony Optimization.