

# Multi-agent Bio-inspired Algorithms for Wireless Sensor Network Design

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**Abstract—** The process of designing a wireless sensor network (WSN) is rather complicated. This process is not formalized in the form of a hard set of rules, algorithms and standards that guarantee the construction of WSN satisfying different requirements of the designer. This paper discusses the problem of constructing a WSN structure. In the proposed functional diagram of the WSN design we can allocate the place of synthesis WSN structure functional block. Bio-inspired algorithms simulate natural processes of self-organization and evolution. The author proposes to use several multi-agent bio-inspired algorithms for synthesis of WSN structure. Fitness function performs multi-objective fuzzy expert evaluation of various WSN parameters. All considered algorithms modify the global pheromone memory. The work shows the results of the synthesis of WSN topology on an object with space constraints. The results illustrate the possibility of using different self-organization animal models to solve some problems arising in the process of building self-organizing wireless sensor networks.

**Keyword—** sensor networks, graphs, bio-inspired algorithms, network synthesis



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