

# **ABSTRACT**

**on bachelor's thesis**

on topic: Base Station Placement Algorithm for  
Large-Scale LTE Heterogeneous Networks

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Work carried out on 61 pages containing 17 figures, 7 tables. The paper has been written with 31 references to different sources.

In modern social reality it is hard to stay away from communication with people. We spend time in social networks, call relatives, check weather on the internet, that is our daily routine. Due to the development of wireless telecommunication systems, we can be in touch with people from different countries. The demand for mobile services is growing rapidly, requirements for telecommunication systems are also increasing. Logically, mobile operators need to expand the network. But for them the new network development is too expensive, in some cases usual BS deployment will only worsen the situation, especially when this question stays for planning cell locations in urban areas. In such conditions users are densely located in small areas, who want to take good quality of service. Usual cells don't have such capacity, to meet their needs. Therefore, it was decided to modernize the network using microcells, for solving problems in their center. The problem is that the number of cells will increase sharply in the future. That's why we need to locate them properly for maximizing network performance. That's the task for evolutionary algorithms, which have already shown their effectiveness in a number of applications. But their problem is that modern EA-based solutions are suboptimal, they take a lot of time to process and show poor results when used for large-scale networks. Which can't increase standard results. The problem of modernization of existing solutions, or creation of

new algorithm, for a possibility of its use at deployment of large-scale networks is actual.

Therefore, the purpose of the work is to find the optimal evolutionary algorithm for optimizing the process of LTE base stations deployment.

The results of this study can be used to deploy new cells and to optimize existing LTE networks. Or on the basis of these data it is possible to develop new decision, for the big variation of applications of evolutionary algorithm in world practice.

**Key words:** evolutionary algorithms, cellular network optimization, new cells deploying, intercell interference.