CELL COVERAGE OPTIMIZATION FOR THE MULTICELL MASSIVE MIMO UPLINK

A Project report submitted in partial fulfillment of the requirements for the award of degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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CERTIFICATE

This is to certify that the project entitled "**CELL COVERAGE OPTIMIZATION FOR THE MULTICELL MASSIVE MIMO UPLINK**" in partial fulfillment for the of degree of Bachelor of Technology in ELECTRONICS AND COMMUNICATION ENGINEERING, at **AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY**, MAKAVARAPALEM, VISAKHAPATNA is an benefited work carried out by **P.NANAJI, S.PAVAN KALYAN, A.N.RAMKRISHNA NAIDU, S.BALA NANDA SWAMY** under the guidance and supervision during 2015-2019.

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PROJECT GUIDE

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ABSTRACT

We investigate the cell coverage optimization problem for the massive multiple-input multiple-output (MIMO) uplink. By deploying tilt-adjustable antenna arrays at the base stations (BSs), cell coverage optimization can become a promising technique that is able to strike a compromise between covering cell-edge users and pilot contamination suppression. We formulate a detailed description of this optimization problem by maximizing the cell throughput ,which is shown to be mainly determined by the user distribution within several key geometrical regions. Then, the formulated problem is applied to different example scenarios. Fora network with hexagonal cells and uniformly distributed users, we derive an analytical lower bound of the ergodic throughput in the objective cell; based on this, it is shown that the optimal choice for the cell coverage should ensure that the coverage of different cells does not overlap. For a more generic network with sector-shaped cells and nonuniformly distributed users, we propose an analytical approximation of the ergodic throughput. After that, a practical coverage optimization algorithm is proposed, where the optimal solution can be easily obtained through a simple 1-D line searching within a confined searching region. Our numerical results show that the proposed coverage optimization method is able to greatly increase the system throughput in macro cells for the massive MIMO uplink transmission, compared with the traditional schemes where the cell coverage is fixed.