ABSTRACT

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This dissertation aims to investigate the design of millimetetric wave beamforming codebooks for mobile communication. To concentrate power in the desired direction, a phase shift vector is applied to an antenna array. In order to perform the beamforming with low complexity in a mobile terminal, we design a codebook containing codewords that define the phase shift to steer the beam in a desired direction. In this work, the number of elements of a codebook is reduced, using a greedy algorithm, K-means algorithm and a hybrid algorithm mixing both. The results obtained in this works shows that the use of a hybrid algorithm mixing K-means with greedy algorithm yields a codebook with superior performance than the one indicated in IEEE 802.15.3c in terms of the spherical coverage, but containing fewer elements.

Keywords: Wireless channels. Beamforming. MIMO. Codebook design.