

### عنوان مقاله:

A 3D Time-Variant Non-Stationary Hybrid Channel Model for Massive MIMO Systems

محل انتشار:

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## نویسندگان:

Mohammad Mehdi Tamaddondar - Department of Communication Technologies ICT Research Center Institute, Tehran, Iran

Narges Noori - Department of Communication Technologies ICT Research Center Institute, Tehran, Iran

## خلاصه مقاله:

This paper presents a novel three-dimensional (3D) time-variant hybrid channel model for massive multiple input multiple output (M-MIMO) wireless systems. The main aim of the proposed model is to find channel characteristics in a simple and precise manner. To achieve this purpose, this channel model consists of two deterministic and stochastic modes. By using the idea of equivalent planes and ray tracing method, the channel multipath components (MPCs) are calculated in the deterministic mode. In the stochastic mode, those parts of the propagation environment that are too complex to be modeled in the deterministic mode, are modeled based on the cluster concept. Then, the MPCs characteristics are calculated by utilizing appropriate random distributions. The doppler effect is also taken into account due to the probability of existence relative velocities among channel components. This model is validated by comparing simulation results with those of the previously developed channel models. Finally, the channel model is .applied to a real scenario to extract some of the important characteristics of the propagation environment

**کلمات کلیدی:** Channel modeling, doppler effect, clustering, massive MIMO, ray tracing, 5G

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