Triband MIMO Metamaterial Antenna design for 5G IoT applications with Machine Learning Algorithm

This research work concentrate on the design of Triband MIMO antenna made of metamaterial (MTM). Metamaterials are those materials that are artificially generated substance to pass light, sound and any specific function of interest which in turn can improve electromagnetic performance. This design is for both millimetre wave and microwave band frequencies. The Triband design frequencies aim in the range of S band, C band and K_a band. This design uses Rogers RT-5880 substrate that has a multi-stubbed radiating patch and an orthogonal arrangement of an epsilon-negative MTM array positioned between the antenna elements. Rogers RT 5880 has stable low loss dielectric constant for wide range of frequencies. Epsilon negative MTM array enhance antenna gain, filtering, and reducing mutual coupling in wireless systems. This arrangement target for 5G IoT applications that will show the better operation compared to the available design with better mutual coupling. Simulation results will show better gain in all design bands. Diversity performance metrics such as Envelope correlation coefficient (ECC) and Diversity gain will result in appreciable values. In addition KNN ML performance verification algorithm confirms the antenna's bandwidth and efficiency accuracy. Furthermore the proposed triband antenna can be used in Vehicle-to-Network (V2N), Vehicle-to-Cloud (V2C) communications, and 5G cellular networks