
#### Abstract

The Vehicle-to-Vehicle communication system has an important role in the Intelligent Transportation System. In Vehicle-to-Vehicle communication, both the sender and receiver are in motion in a multipath fading environment. The movement of the sender and receiver causes a Doppler effect known as the Doppler shift. This study modeled the Doppler spectrum using the Fourier transform method of the complex envelope autocorrelation function. The autocorrelation function compares the complex envelope signal under Rician fading vehicle to vehicle conditions. Observation of system performance using the validation process of the Rayleigh and Rician distribution and then carry out the validation process of the autocorrelation function. The results obtained in the validation process of the Rayleigh and Rician distributions produce a signal amplitude of the Rician fading channel that is greater than the Rayleigh fading channel. Then. the effect of speed on the accuracy of the distribution theory used in this study is valid close to the theoretical results. The process of validating the autocorrelation function of the complex envelope signal in the vehicle to vehicle communication Rician fading channel, has a high correlation or high correlation, with the result that the average coefficient value is $=1$, at speeds of $20 \mathrm{~m} / \mathrm{s}, 60$ $\mathrm{m} / \mathrm{s}$, and $100 \mathrm{~m} / \mathrm{s}$. The results of the Doppler spectrum from the Fourier transform of the channel gain autocorrelation function, produce a Doppler spread detection that corresponds to the actual Doppler spread, with an accuracy rate of $99.77 \%$. The results obtained indicate that the Doppler spectrum modeling can model the Doppler shift conditions on the speed that appears in a multipath fading environment with an accuracy rate of $99.77 \%$ in this study on vehicle-tovehicle communication Rician fading channel.


Keywords: Vehicle-to-Vehicle Communication, Multipath Fading, Doppler Spectrum. Fourier transform, Autocorrelation.

