

Title: Survival probability of precipitations and rain attenuation in tropical and equatorial regions

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Abstract: This contribution presents a stochastic model useful for the generation of a long-term tropospheric rain attenuation time series for Earth space or a terrestrial radio link in tropical and equatorial heavy rain regions based on the well-known Cox-Ingersoll-Ross model previously employed in research in the fields of finance and economics. This model assumes typical gamma distribution for rain attenuation in heavy rain climatic regions and utilises the temporal dynamic of precipitation collected in equatorial Johor, Malaysia. Different formations of survival probability are also discussed. Furthermore, the correlation between these probabilities and the Markov process is determined, and information on the variance and autocorrelation function of rain events with respect to the particular characteristics of precipitation in this area is presented. The proposed technique proved to preserve the peculiarities of precipitation for an equatorial region and reproduce fairly good statistics of the rain attenuation correlation function that could help to improve the prediction of dynamic characteristics of rain fade events.