

## **ABSTRACT**

*This thesis presents a model for multiple-input multiple-output (MIMO) wireless fading channel. The model is simplified to the narrowband channels. This model uses the correlation matrices at the base station and mobile station to characterize the fading correlation. The model is more general and realistic than the usual independent and identically distributed model.*

*The validation of the model is based on comparing with the METRA's model. The model has also been used to investigate the behavior of capacity of MIMO wireless channels. It is shown that the fading correlation affects the MIMO capacity by modifying the distribution of gains of single-input single-output (SISO) channels.*

*The channel capacity of MIMO 4 x 4 configuration, considering three environment conditions, correlated, uncorrelated, and partially-correlated, achieving capacities 16 b/s/Hz, 11 b/s/Hz, and 14 b/s/Hz at a SNR of 20 dB. Decorrelation distance  $2\lambda$  is achieved in partially-correlated environment environment. In uncorrelated and correlated conditions, by adding one antenna element at base station and mobile station simultaneously, improve capacity by 4 b/s/Hz and 2 b/s/Hz respectively.*