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## *Benefits of Single User Interference Cancellation Methods in Wireless Ad Hoc Networks*

Wireless communications is a quickly growing field. There is also a growing need for large decentralized, not otherwise organized wireless 'ad hoc' networks. As the size and density of these networks is increased, so does the overall interference level making successful transmissions less likely for a given threshold value of Signal to Interference plus Noise Ratio (SINR). Two methods of interference cancellation have been proposed. The first is  $k$ -level Successive Interference Cancellation (SIC) which attempts to iteratively decode the first  $k$  interferers and then subtract their contribution from the interference, effectively increasing SINR. The other method is  $k$ -level Joint Detection (JD) which attempts to jointly (simultaneously) decode up to  $k$  of the strongest interferers. This analysis has compared the effects of JD and SIC for  $k=1$  (single interferer cancellation) on the probability of a failed transmission (Outage Probability) by using spatial geometry techniques common to current research in Wireless Communication systems. The results show that JD mostly outperforms SIC for both lower network densities and larger threshold values of SINR while both mostly outperform no cancellation. Lower bounds are established on the Outage Probabilities for JD and SIC.



Poster Number:      Session: