

Transmitting to Co-located Users in Wireless Ad-Hoc and Sensory Networks *†

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Abstract

We consider wireless Ad-Hoc networks and sensory networks where a remotely located source is transmitting information to a destined user embedded within a group of K densely packed physically co-located users enjoying outstanding SNR conditions among themselves, but suffering from quasi-static flat Rayleigh fading with respect to the source. Stringent delay constraints require that information, once available, be transmitted immediately and delivered reliably to its destination during a period of one fading block, precluding waiting until the destined user enjoys optimal fading condition. A cooperative transmission strategy is proposed for this scenario and its expected throughput is investigated. The strategy exhibits a substantial gain in throughput especially when the co-location gain factor is high. In addition, a broadcast approach is incorporated into the transmission strategy suggesting further throughput benefits.

Keywords— Wireless networks, Ad-Hoc networks, Fading channels, Cooperative diversity, Relay channel, Expected throughput, Outage capacity.

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