Massachusetts Institute of Technology
6.888: Wireless Communications Systems
Professor: Dina Katabi

September 13, 2013

Mini-Assignment 2: Interference Cancellation

(Due : Thursday, Sept 19, 2013 @ 3pm)

True or False:

True 1. Consider two nodes in a hidden terminal scenario. Each node transmits at the highest rate supported by its channel in the absence of the other node (i.e., as close to the capacity of the channel between itself and AP as possible). The two nodes run a protocol different from 802.11 which transmits each packet once and does not make retransmissions. In this case, no decoding scheme (neither ZigZag nor Interference cancellation nor any other scheme) at the access point is useful.

Why ? *The combined rates fall outside the capacity region for a two sender, common receiver system.*

False 2. ZigZag decoding requires that the two colliding nodes have the same frequency offset

Why ? *The frequency offsets of both the nodes can be estimated and corrected independently at the access point.*

False 3. Successive interference cancellation in the paper by Halperin et al requires that one signal is received at significantly more power than the other.

Why ? *but it is also acceptable to say TRUE. Specifically, SIC is independent of which signal has a higher power than the other as long as one signal has a rate that is lower than BW log (1+ SINR), that is as long as one transmitter used a rate that is low enough to allow us to decode him while considering the other as noise. The reason why we accept that you say it is true is that the particular method that Halperin used to decode assumes that one signal is received at much higher power.*

False 4. Successive interference cancellation in the paper by Halperin et al requires that at least one signal is received at significantly high power. The other signal may also be received at a similarly high power.

Why ? *Again the power alone is not an issue as long as the transmission rate of one sender is below the capacity after considering the power of the interferer as noise.*