

SPACE-TIME CODING FOR WIRELESS COMMUNICATIONS

Dr. Moeness Amin

Future wireless communication systems have to deal with increasing demands for high data-rate, high quality data services. The information capacity of wireless communication systems increases dramatically by employing multiple transmit and receive antennas. An effective approach to increasing data rate over wireless channels is to employ coding techniques appropriate to multiple transmit antennas. Such a technique is called space-time coding. Space-time coding is a coding technique that is designed for use with multiple transmit antennas and single/multiple receive antennas. Space-time coding is a technique that combines channel coding, which provides protection against signal failure, and multiple-antenna transmission, which provides diversity to combat channel fading. It introduces temporal and spatial correlation into signals transmitted from different antennas, in order to provide diversity at the receiver, and coding gain over an uncoded system without sacrificing the bandwidth. The spatial-temporal structure of these codes can be exploited to further increase the capacity of wireless system with a relative simple receiver structure. There are several kinds of techniques in which to perform coding across the transmit antennas including space-time block coding (ST-BC), space-time trellis coding (ST-TC), layered space-time coding (BLAST) and space-time turbo coding (ST-TuC).