Layered Space Time Processing Reduces Interference in a Multiple Antenna Wireless Communications System

INVENTORS • Akbar Sayeed, Ke Liu

OVERVIEW

Currently, multiple antennas are used at both the transmitter and receiver in wireless communication systems. Wireless channel capacity is expanded by increasing the number of transmit antennas.

Due to the high-dimensional nature of multiple antenna array systems, methods for reducing interference have been developed to lower the computational complexity required for practical systems. Space-time processing is a key technology for removing interference, which allows full realization of wireless channel capacity. A promising space-time processing architecture, called BLAST, has recently been developed by Bell Laboratories; however, it requires a significant amount of processing power.

THE INVENTION

UW-Madison researchers have developed a system and method for performing space-time processing, which efficiently and reliably remove interference for multiple antenna array systems. This invention uses baseline algorithms that significantly simplify signal processing at the receiver compared to BLAST. Furthermore, the invention includes extended algorithms that can eliminate the bottleneck in BLAST performance caused by error propagation. The extended algorithms can be applied to existing systems employing BLAST-type processing, without altering their structure.

APPLICATIONS

• Wireless communications

KEY BENEFITS
Simple yet effective approach to achieve high data rates in multiple antenna wireless communication systems
Applies to multiple antenna systems with any number of transmitters and receivers
Unlike BLAST, this invention can be applied to situations where transmit antennas outnumber receive antennas
Provides dramatic performance improvements over existing systems, including Bell Labs BLAST and V-BLAST
Mitigates the effect of error propagation due to imperfect decision feedback in layered space-time structures
More reliable wireless communication system, in part because it begins with a higher order diversity sub-channel
Very efficient at removing interference

ADDITIONAL INFORMATION

Tech Fields
Information Technology - Telecommunications

CONTACT INFORMATION

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846.