Separating Sequence Design for Multi-Relay Networks under Multipath Fading

Inventor: H. Kwon, J. Yang, K. Pham (USAF)
Identification Number: 14IP057

Technology
In collaboration with Kirtland Air Force Base, Wichita State University researchers have developed a novel design for multi-relay networks. Multipath fading can degrade the performance of a wireless communication system when the data rate is higher than long-term evolution advanced systems. However, an effective method to combat multipath fading is a code division multiple access (CDMA) scheme. The objective of this invention is to propose a unique, simple and effective method of finding optimum non-binary pseudo noise (PN) spreading and de-spreading sequences. This invention also examines the sensitivity of the proposed schemes to mistiming alignment, wideband jamming and imperfect channel state information. Simulation results verify that the proposed method shows much faster convergence in finding optimum PN sequences and better performance than existing schemes under the same environment.

Benefits
- Increased performance over those with non-adaptive PN sequences
- DS-CDMA relay network is secure, compared to existing systems with fixed-PN sequences
- Network is unique, simple and efficient compared to existing methods

Application
- Commercial and military communication systems

Opportunity
- Available for license/purchase
- Potential for ongoing collaboration with inventors Hyuck Kwon, Jie Yang and WSU Researchers

Contact
Becky Hundley, Contracts & Intellectual Property Manager
becky.hundley@wichita.edu
316.978.5199

Fig.5. (a) and (b): maximum singular value versus iteration index for two sources and one destination by using proposed algorithm. (c) and (d): maximum eigenvalues using algorithm in [14, eq. (17)] under same environment.