Topological Interference Management Framework for Device-to-Device Communication

ABSTRACT

This paper considers the topological interference management (TIM) problem in a partially connected network where Device-to-Device (D2D) enabled devices are not aware of the surrounding devices' channel state information (CSI) but only of the network connectivity to cancel the interference occurred. We model TIM as a low-rank-matrix-completion problem and solve it using a novel scheme based on semidefinite programming (SDP) while overcoming TIM matrix special structure with hard constraints. Our simulations show a matrix rank reduction ability that outperforms other existing methods, and thus corresponds to a lessening in signal interference: a key need in D2D networks.

EXISTING SYSTEM

- In existing system, use of the Riemannian optimization to address the convergence issues of the aforementioned techniques, their algorithms suffer from a high computational complexity.
- To benefit from algebraic approaches that need less computations, other authors viewed the rank minimization as a trace minimization.
- However, this norm behaves the same as the nuclear norm, and always gives a full rank matrix as the optimal solution.

PROPOSED SYSTEM

- We propose to approximate the TIM matrix rank by a smooth approximation and to convert the problem into an SDP form, by introducing slack variables and using several transformations.
- The key step of our method lies in the development that forces the SDP approximation to return a non-diagonal matrix, and hence allowing to decrease the TIM matrix rank.
- To increase the system degrees of freedom (DoF) of a partially connected network of D2D enabled devices with no CSI, to manage the occurred interference, and hence to increase the network throughput.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

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