Journal Watch

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Wireless Energy Harvesting in a Cognitive Relay Network

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Wireless Energy Harvesting in a Cognitive Relay Network

Goal: Study outage probability and throughput in SN

- Harvested energy: $E_{h_s} = \eta P_{PU_{tx}} \sum_{j=1}^{N} |f_{1,j}|^2 \alpha T$
  $E_{h_r} = \eta P_{PU_{tx}} \sum_{j=1}^{N} |f_{2,j}|^2 \alpha T$
- Outage probability: $P_{out}(\gamma_{th}) = 1 - Pr\{\Gamma_R \geq \gamma_{th}, \Gamma_D \geq \gamma_{th}\}$
- Throughput:

  Delay-sensitive transmission, $\tau_{ds} = \frac{\frac{(1-\alpha)T}{2}}{T} R_{ds}(1 - P_{out}(\gamma_{th}))$

  Delay-tolerant transmission, $\tau_{ds} = \frac{\frac{(1-\alpha)T}{2}}{T} \underbrace{\mathbb{E}\{\log_2(1+\Gamma_{th})\}}_{C_{erg}}$

Large system analysis: Convergence in distribution

Novel Compressed Sensing-Based Channel Estimation Algorithm and Near-Optimal Pilot Placement Scheme

Yi Zhang, Ramachandran Venkatesan, Octavia A. Dobre, and Cheng Li

Novel Compressed Sensing-Based Channel Estimation Algorithm and Near-Optimal Pilot Placement Scheme

OFDM system model: $\mathbf{Y} = \mathbf{XH} + \mathbf{W} = \mathbf{XDh} + \mathbf{W}$

$$\mathbf{Y}_p = \mathbf{X}_p\mathbf{D}_p\mathbf{h} + \mathbf{W}_p = \mathbf{A}h + \mathbf{W}_p$$

Channel estimation: Proposed **As-SaMP**

- To find the final support set sparsity level is not needed and it uses step size adaptively.
- Compared with OMP, CoSaMP and SaMP (Sparsity adaptive matching pursuit)

Pilot placement: **Mutual coherence** of the measurement matrix

$$\mu(\mathbf{A}) = \max_{1 \le i,j \le L, i \ne j} \frac{| < \mathbf{a}_i \cdot \mathbf{a}_j > |}{\|\mathbf{a}_i\| \cdot \|\mathbf{a}_j\|}$$

Cluster-Based Radio Resource Management for D2D-Supported Safety-Critical V2X Communications

Wanlu Sun, Di Yuan, Erik G. Strom, and Fredrik Brannstrom

Cluster-Based Radio Resource Management for D2D-Supported Safety-Critical V2X Communications

Goal: Maximize the C-UEs sum rate, subject to the V-UEs' requirements on latency and reliability

Transform V-UE requirements to the SINR relation

$$p_{k'}^{\text{out}} = Pr\left\{\sum_{i=1}^{E_{k'}^{\text{all}}} \rho \log_2\left(1+\frac{\bar{P}_i^r |H_i|^2}{\sigma^2+\sum_{j\neq i}\bar{S}_{j,i}^r |G_{j,i}|^2}\right) < N_{k'}\right\}$$

$$\bar{\gamma}_{k'}^T = \arg\min_{\gamma\in\mathcal{R}^+} Pr\left\{\sum_{i=1}^{E_{k'}^{\text{all}}} \rho \log_2(1+\gamma|H_i|^2) < N_{k'}\right\} \leq p_o$$

$$\bar{\gamma}_i \geq \bar{\gamma}_{k'}^T, \qquad \text{where } \bar{\gamma}_i = \frac{\bar{P}_i^r}{\sigma^2+\sum_{j\neq i}\bar{S}_{j,i}^r} \qquad \forall i = 1,2,\ldots,E_k^{\text{all}}$$

Joint optimization problem

$$\max_{x_{m,k},P_{m,k},S_m} \sum_{m=1}^{M} \log_2 \left(1 + \frac{S_m h'_{\hat{m}(m)}}{\sigma^2 + \sum_{k=1}^{K} P_{m,k} g_{\hat{k}(k)}}\right)$$

subject to:

$$x_{m,k} \in \{0,1\}, \quad P_{m,k} \leq P^{\max} x_{m,k} \quad \forall m,k$$

$$0 \leq P_{m,k}, \quad \sum_{m=1}^{M} \sum_{k,\hat{k}(k)=k'} P_{m,k} \leq P^{\max}, \quad \forall k'$$

$$0 \leq S_m, \quad \sum_{m,\hat{m}(m)=m'} S_m \leq S^{\max}, \quad \forall m'$$

$$\sum_{m=1}^{M} x_{m,k} = 1, \quad \forall k$$

$$\frac{P_{m,k} h_{\hat{k}(k)}}{\sigma^2 + S_m g'_{\hat{m}(m),\hat{k}(k)} + \sum_{l=1,l\neq k}^{K} P_{m,l} g_{\hat{k}(l),\hat{k}(k)}} \geq x_{m,k} \bar{\gamma}_{\hat{k}(k)}^{T}, \quad \forall m,k$$

NP hard

Proposed Algorithm

CROWN:

- **Stage 1:** V-UE Clustering
- **Stage 2:** RB Sharing
- **Stage 3:** Power Allocation

Some more papers

Resource Allocation Techniques for Wireless Powered Communication Networks With Energy Storage Constraint

Hoon Lee, Kyoung-Jae Lee, Hanjin Kim, Bruno Clerckx, and Inkyu Lee

A Robust Opportunistic Relaying Strategy for Co-Operative Wireless Communications

Wei Jiang, Thomas Kaiser, and A. J. Han Vinck

Multi-Hop Relaying: An End-to-End Delay Analysis

Anas Chaaban and Aydin Sezgin

A New Energy-Efficient Beamforming Strategy for MISO Interfering Broadcast Channels Based on Large Systems Analysis

Sang-Rim Lee, Jaehoon Jung, Haewook Park, and Inkyu Lee

Compressed Sensing-Based Clone Identification in Sensor Networks

Chia-Mu Yu, Chun-Shien Lu, and Sy-Yen Kuo