

Cooperative diversity in relay downlink

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Introduction

- General relay transmission using exclusive time-frequency resources
- How can we efficiently use resources?

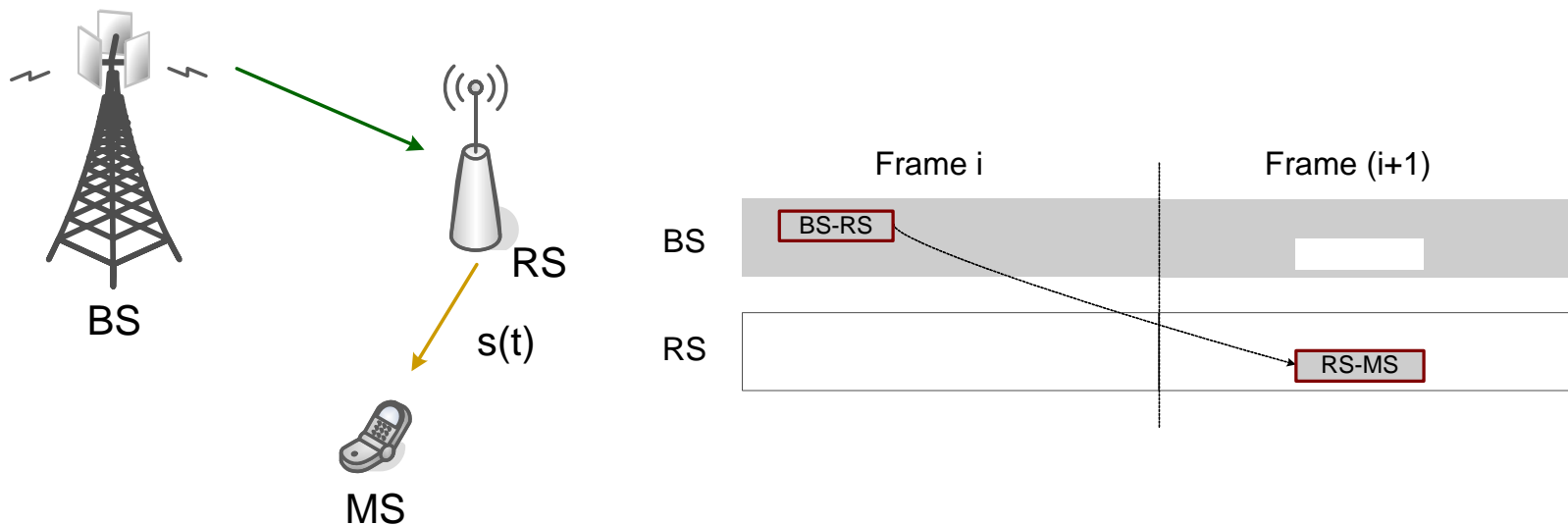


Fig. 1. Example of general relay transmission

Introduction

- General relay transmission using exclusive time-frequency resources
- How can we efficiently use resources?

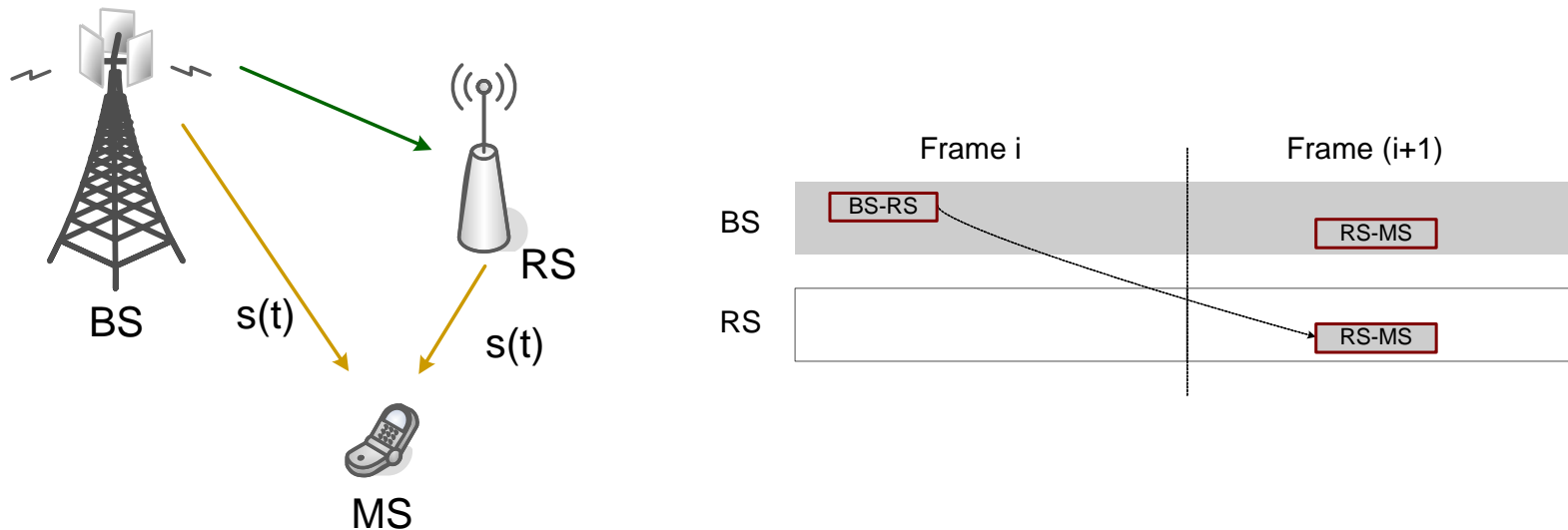


Fig. 1. Example of general relay transmission

Cooperative Relaying in R-DL

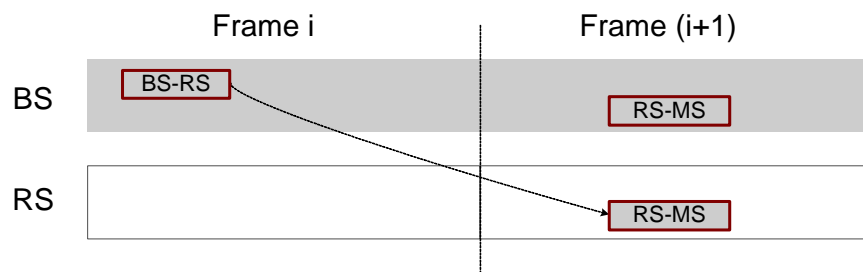
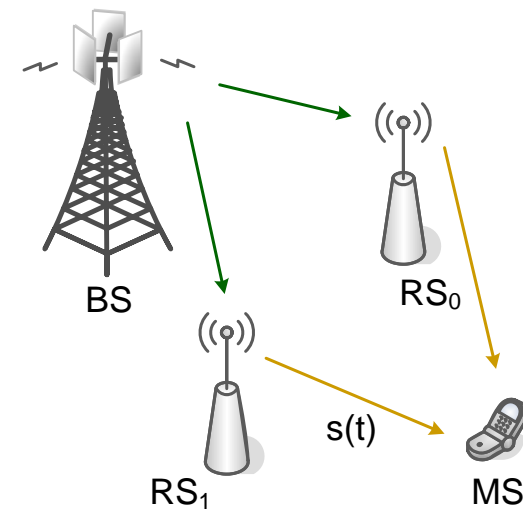
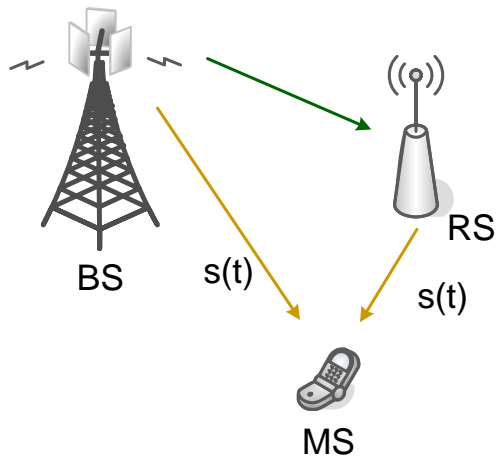
- Cooperative source diversity
 - Multiple sources with the same signals
- Cooperative transmit diversity
 - Multiple sources with STC-coded signals
- Cooperative hybrid diversity
 - Combination of source and transmit diversity

Cooperative source diversity

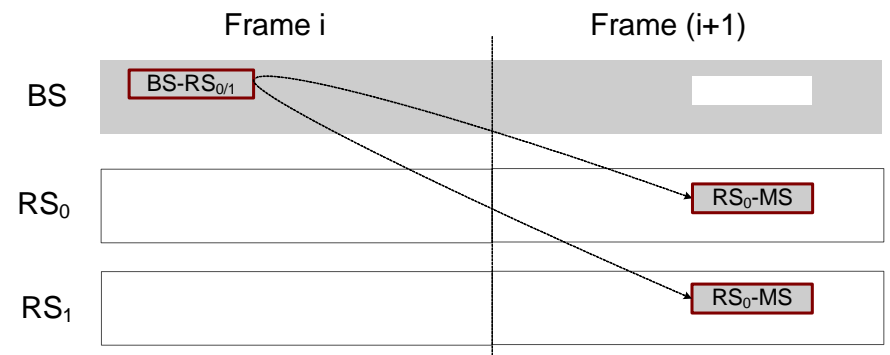
- Legacy SS/MS: no STBC support req'd
- Proposed method
 - Diversity gain using multiple signal sources
 - Simultaneous transmission in one or multiple RS & BS using the same media & data
 - No additional functionality for MS
- Requirement :
 - Timing difference between sources $<$ CP duration

Cooperative source diversity (cont.)

- Example



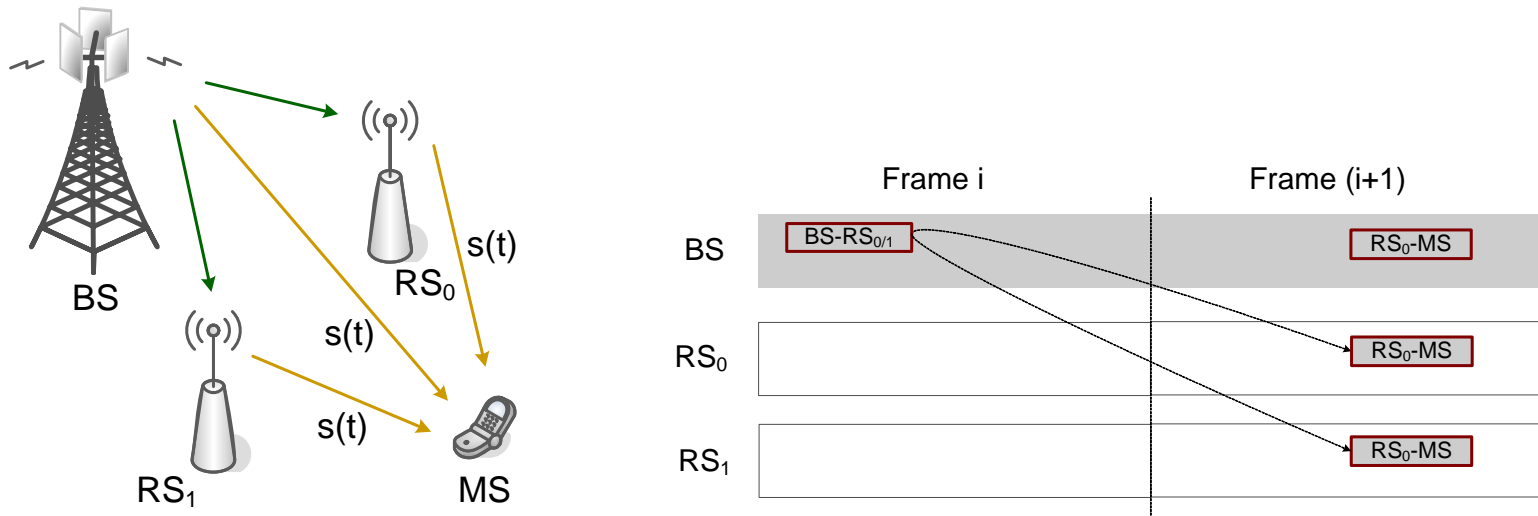
(a) Usage of BS & RS



(b) Usage of multiple RSs

Cooperative source diversity (cont.)

- Example



(c) Usage of BS & multiple RSs

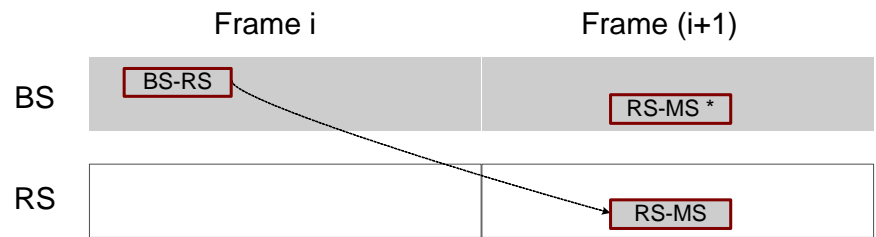
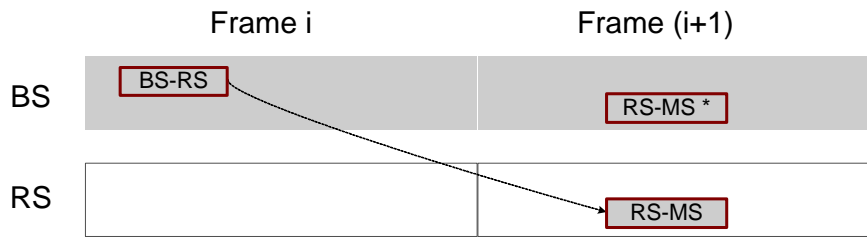
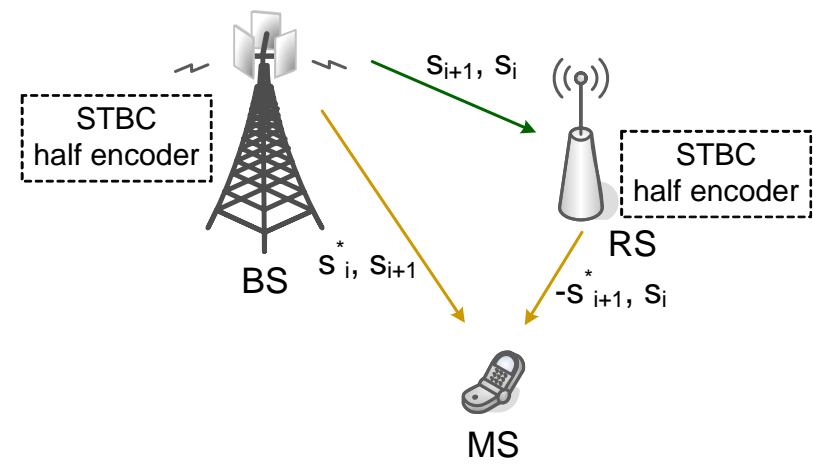
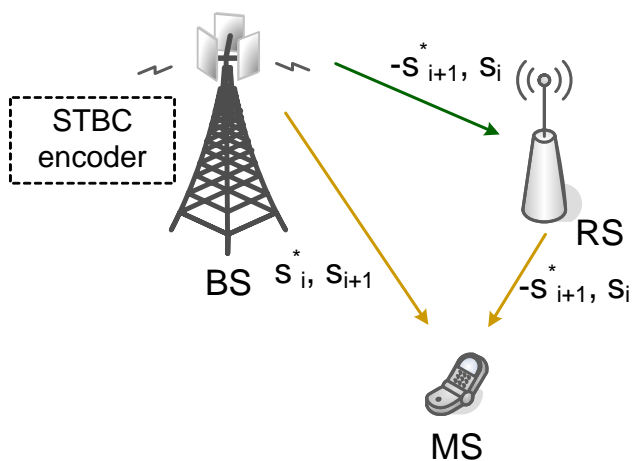
Fig. 2. Examples of cooperative source diversity

Cooperative transmit diversity

- For SS/MS having STBC decoder
- Proposed method
 - Transmit diversity using multiple signal source
 - Usage of different STC encoding in each signal source
 - Two choices: No processing at RS or Low processing at RS
- Requirement :
 - Timing difference between sources $<$ CP duration

Cooperative transmit diversity (cont.)

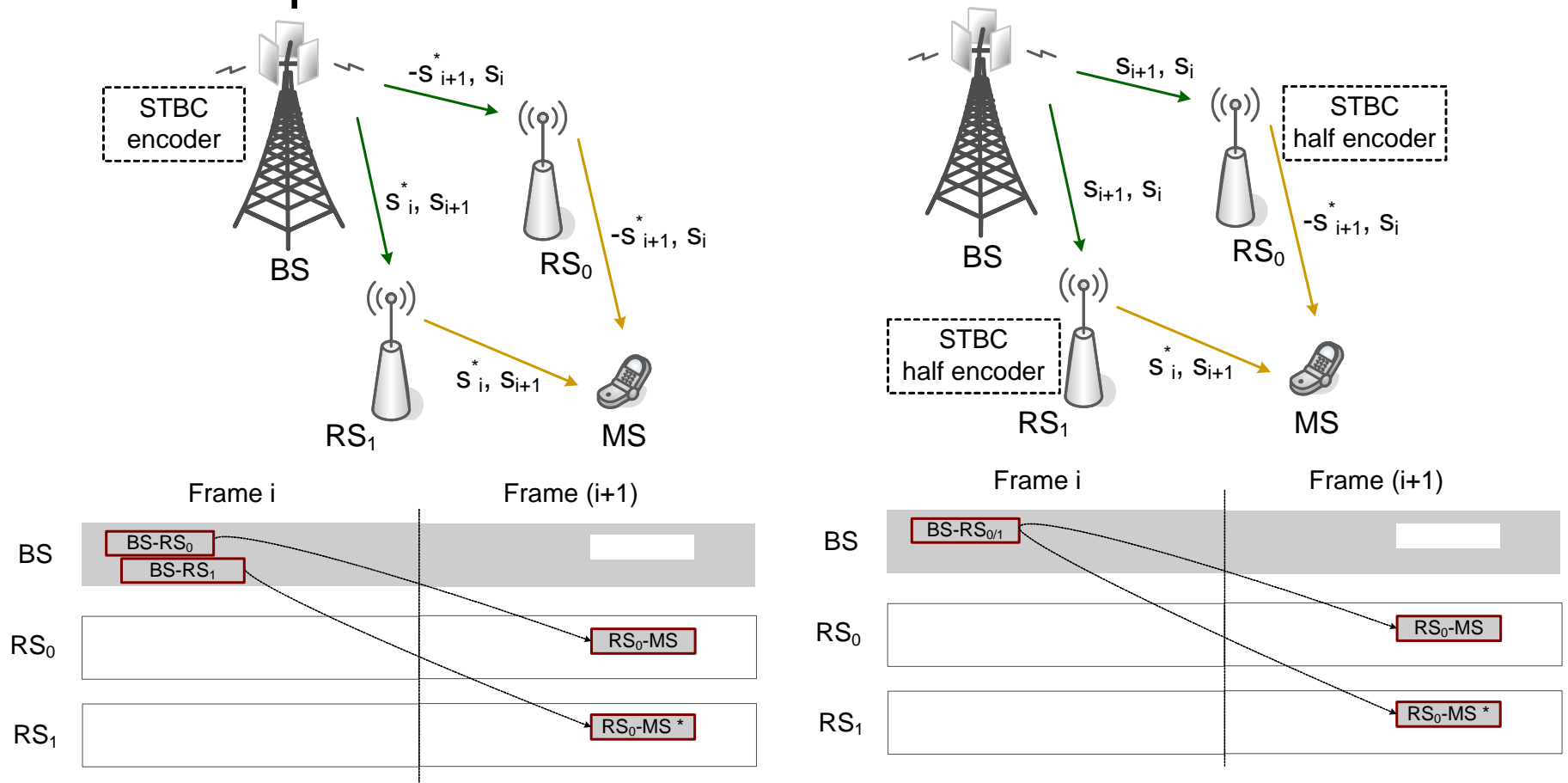
- Example



(a) Usage of the different STC encoded BS & RS

Cooperative transmit diversity (cont.)

- Example



(b) Usage of the different STC encoded RSs

Fig. 3. Examples of cooperative source diversity

Cooperative hybrid diversity

- Combination of source & transmit diversity
- Example

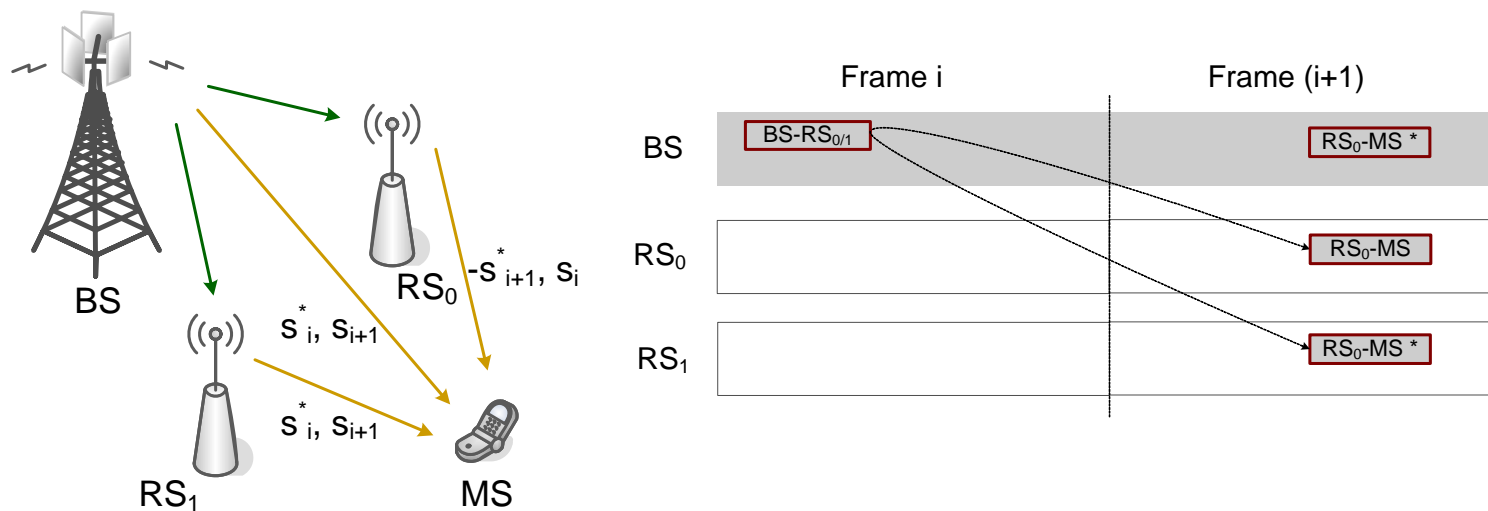


Fig. 4. Example of the same STC encoded sources of BS & a RS and another STC encoded source of RS

Example with STBC for 4 Tx

