Cooperative diversity in relay downlink

IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE S802.16j-06/264r1

Date Submitted:

2006-11-15

Source:

Jimmy Chui, Aik Chindapol, Yishen Sun		Voice:	+1 609 734 3364
Siemens Corporate Research	Fax:	+1 609 734 6565	
Princeton, NJ, USA		E-mail:	aik.chindapol@siemens.com
Kyu-ha Lee, Changkyun Kim, Hyung Ki Kim	Voice:	+ 82 31 280 9917	
Samsung Thales Co., Ltd.	Fax:	+ 82 31 280 1620	
San 12-1, Nongseo-Dong, Giheung-Gu,		E-mail:	kyuha.lee@samsung.com
Yongin-City, Gyeonggi-Do, Korea 446-712			
Byung-Jae Kwak, Sungcheol Chang, D. H. Ahn, Young-il Kim	Voice:	+ 82 42 860 6618	
ETRI	Fax:	+ 82 42 860 1966	
161, Gajeong-Dong, Yuseong-Gu, Daejeon, Korea 305-350	E-mail:	bjkwak@etri.re.kr	

Venue:

IEEE 802.16 Session #46

Base Document:

None

Purpose:

IEEE 802.16jThis is a response to Call for Technical Proposals regarding IEEE Project P802.16j.

Notice:

Release:

IEEE 802.16 Patent Policy:

Introduction

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

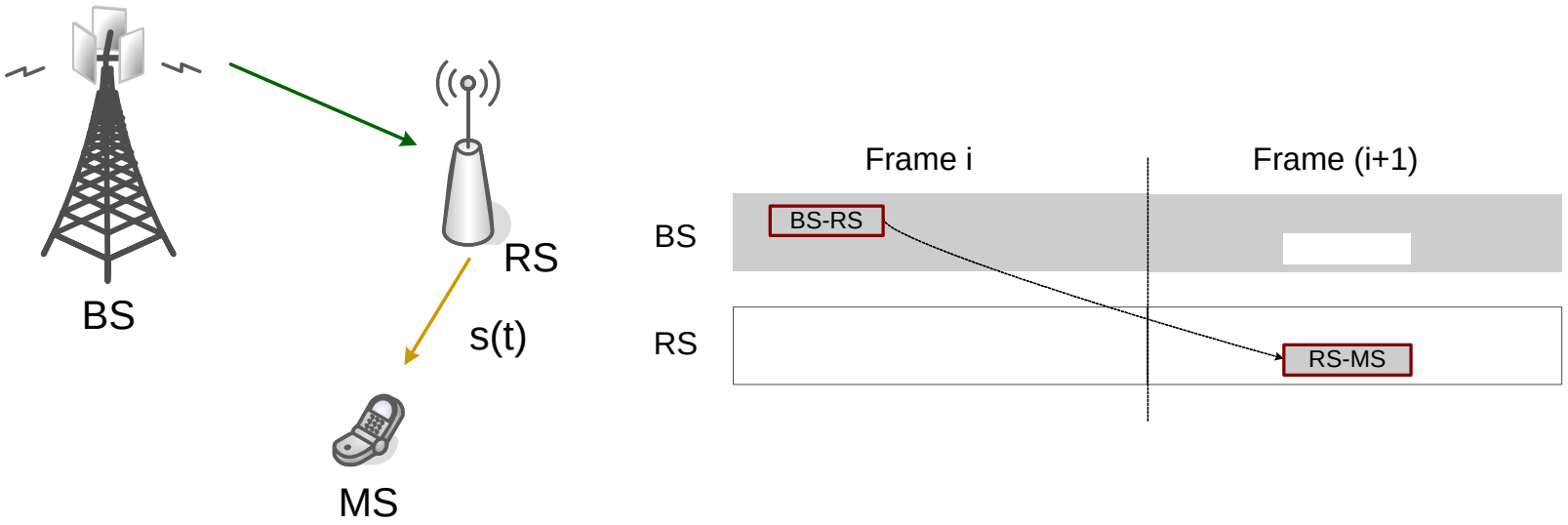


Fig. 1. Example of general relay transmission

Introduction

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

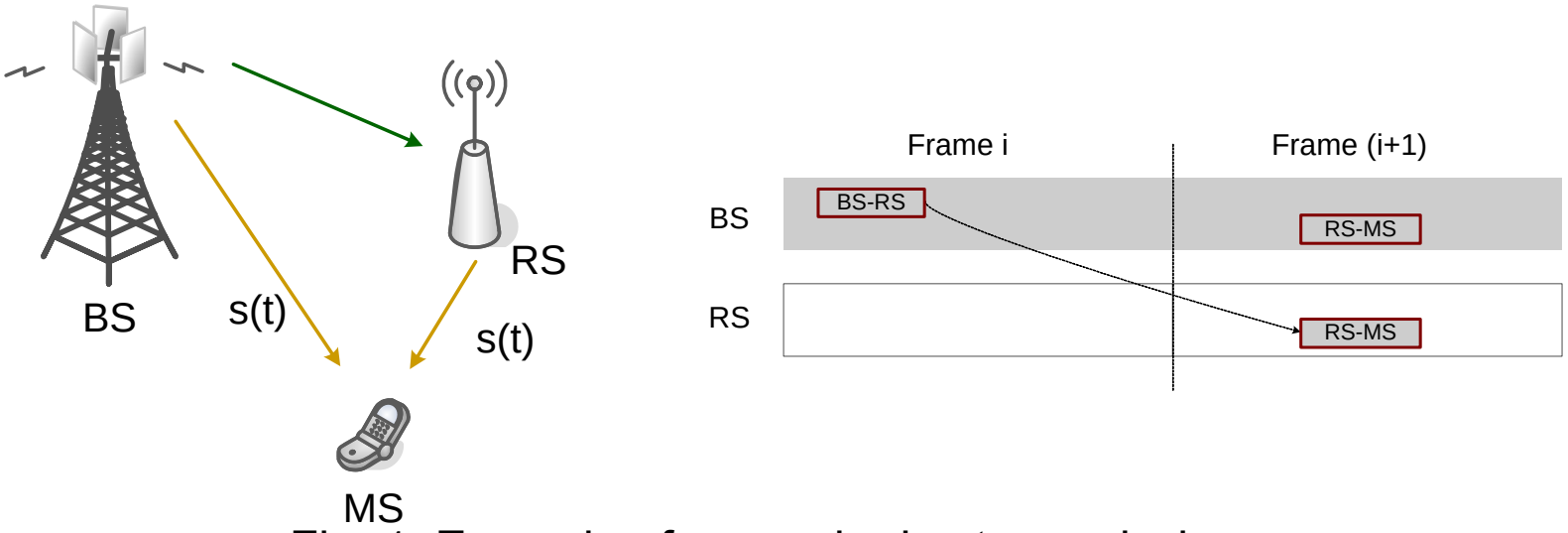


Fig. 1. Example of general relay transmission

Cooperative Relaying in R-DL

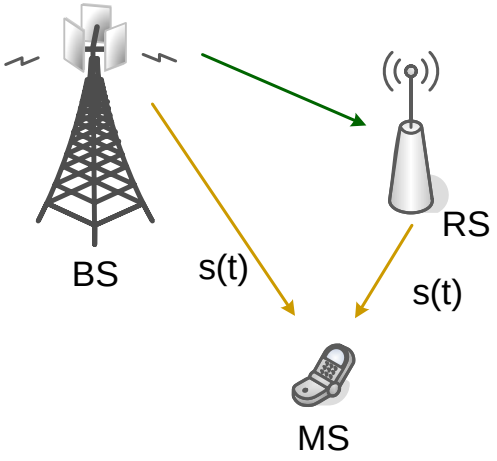
- Cooperative source diversity
  - Multiple sources with the same signals
- Cooperative transmit diversity
  - Multiple sources with STC-coded signals
- Cooperative hybrid diversity
  - Combination of source and transmit diversity

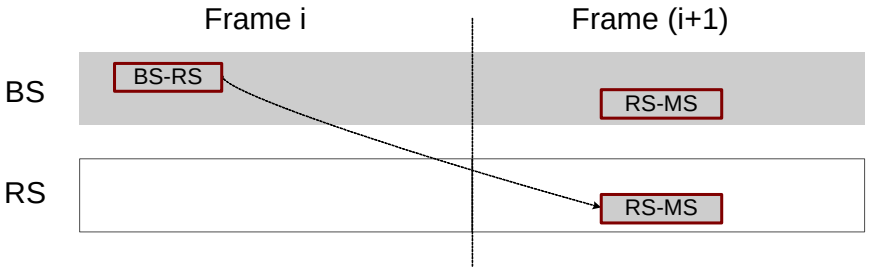
Cooperative source diversity

- 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

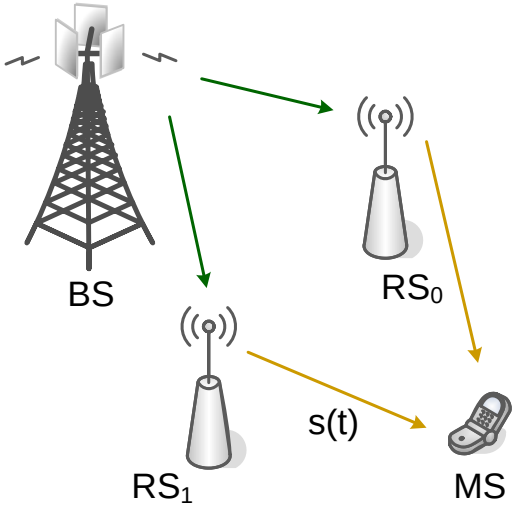
Cooperative source diversity (cont.)

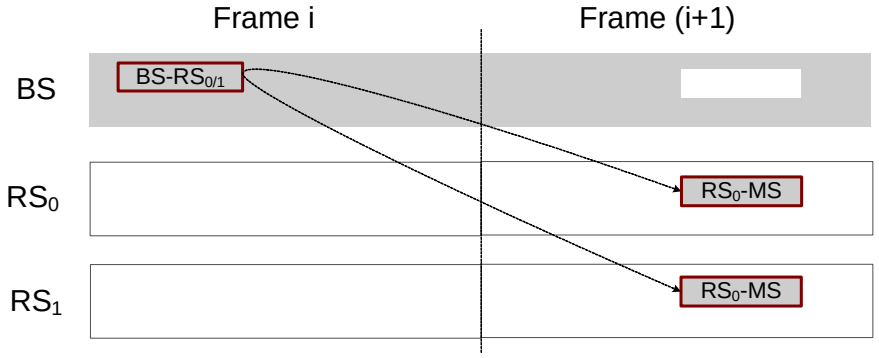
- Example





(a) Usage of BS & RS

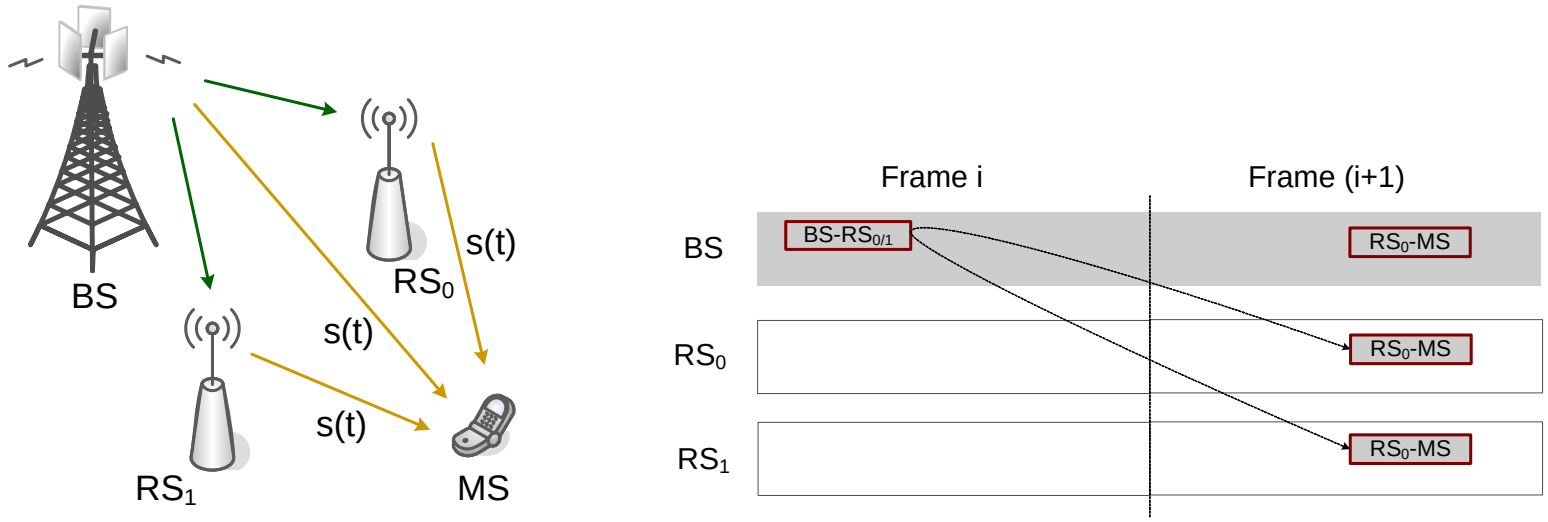




(b) Usage of multiple RSs

Cooperative source diversity (cont.)

- Example



(c) Usage of BS & multiple RSs

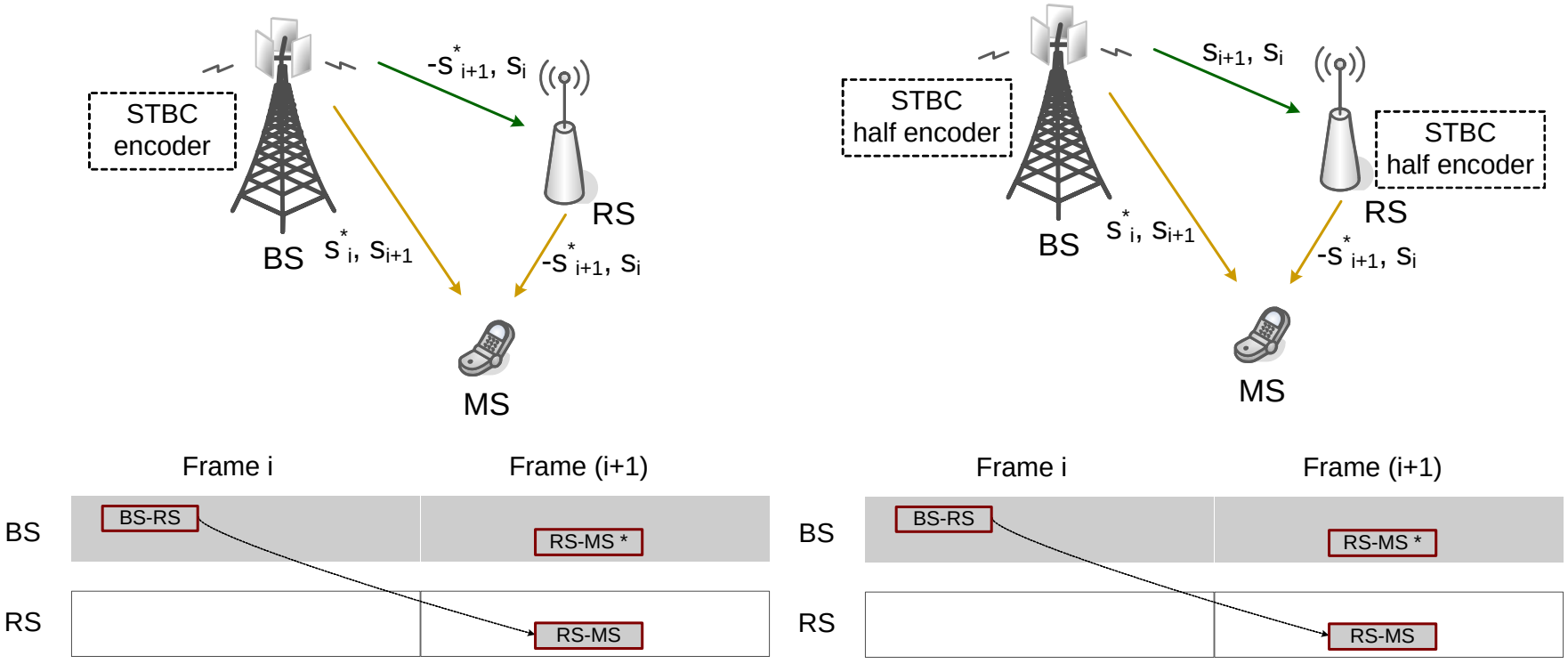
Fig. 2. Examples of cooperative source diversity

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.)

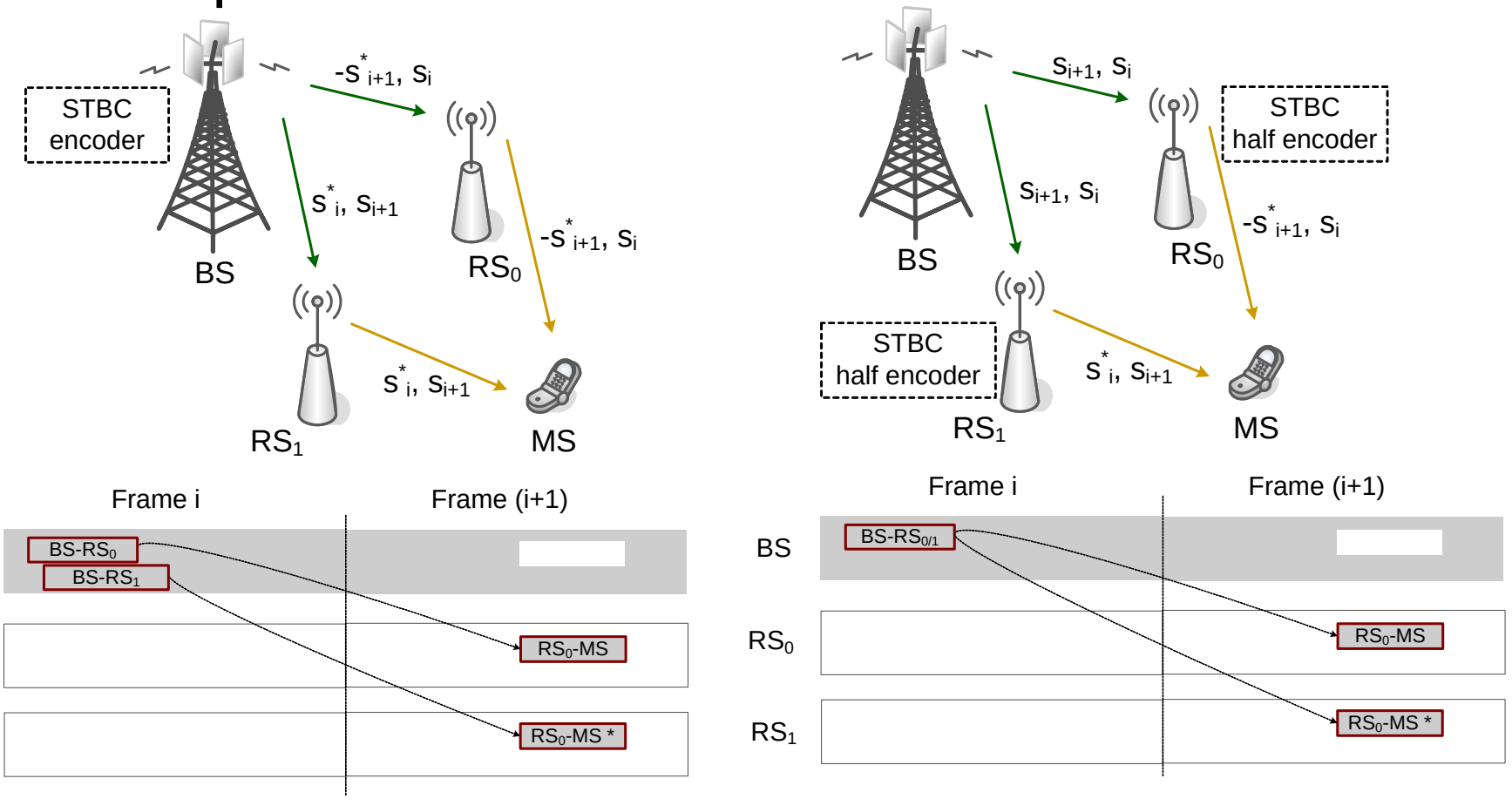
- Example



(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

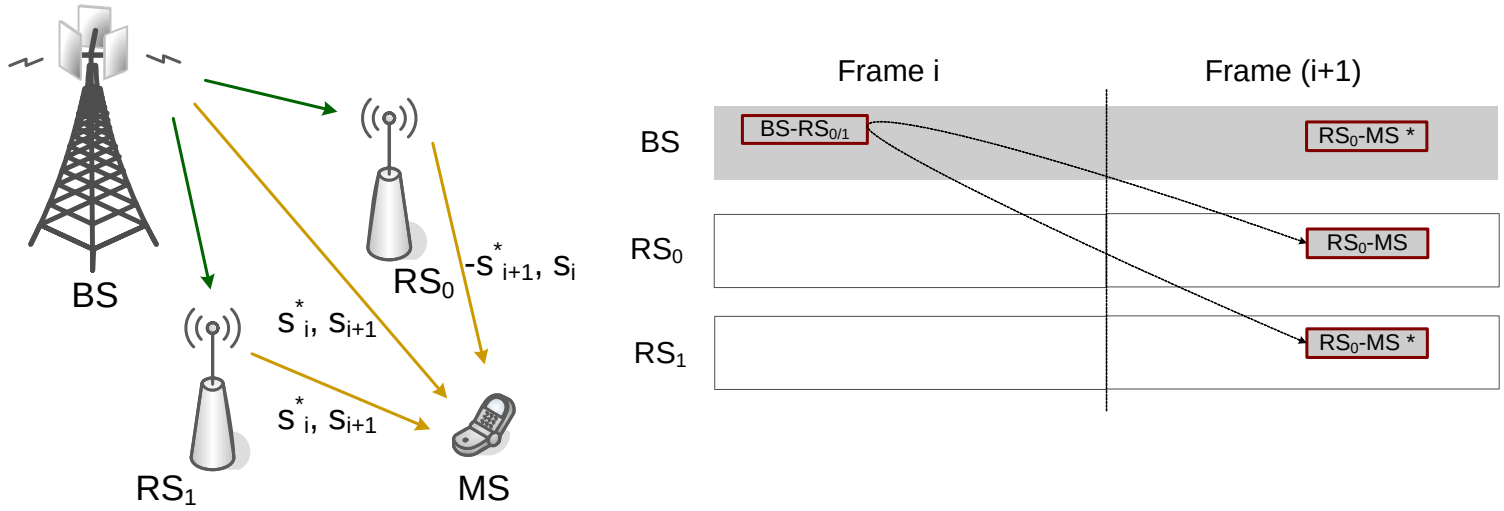


Fig. 4. Example of the same STC encoded sources of BS & a RS and another STC encoded source of RS

Example with STBC for 4 Tx