Secret Share Dissemination across a Network

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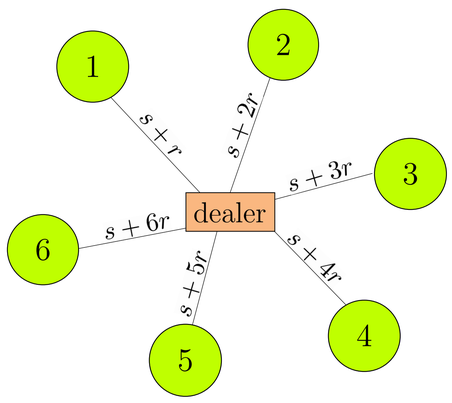
Shamir's Secret Sharing Scheme

- A dealer has a secret **s**
- Distribute shares (functions of s) to n participants such that
  - any k can recover s
  - any (k-1) get no information about s

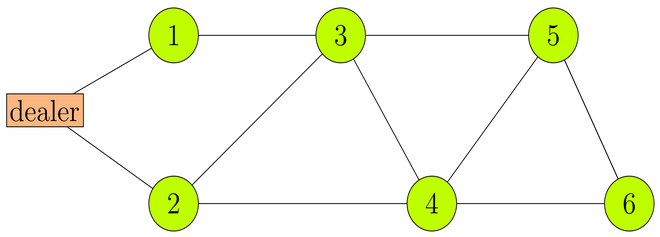
Example: k = 2



- Most protocols assume dealer has direct links to all participants

Problem

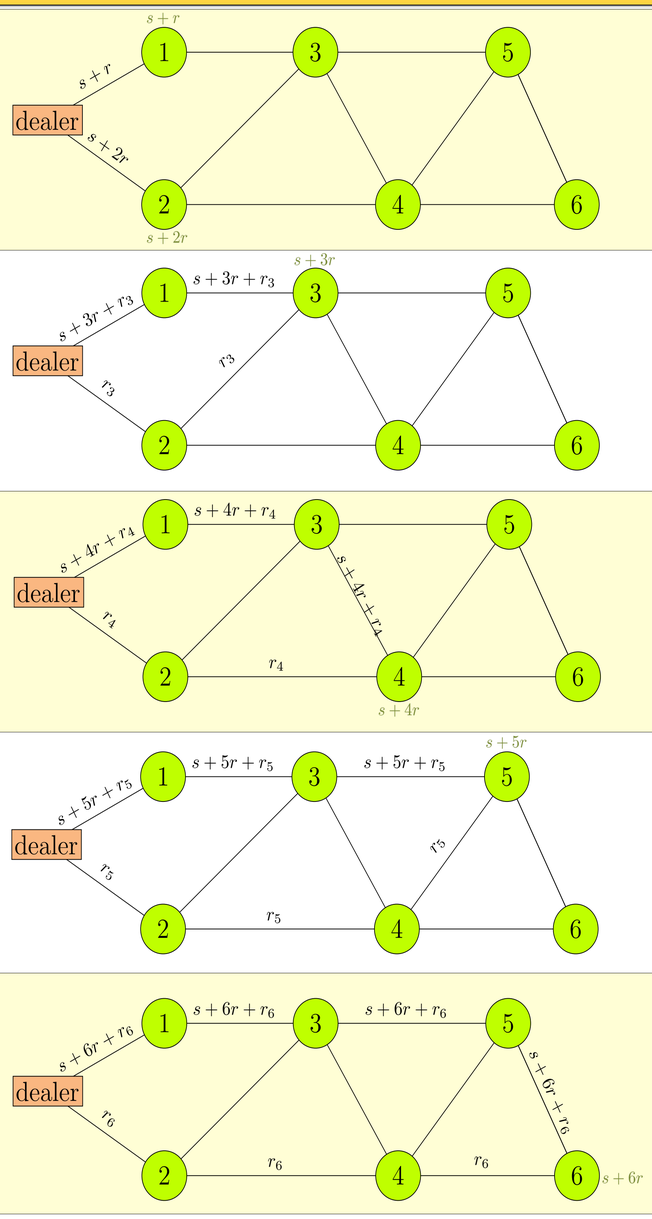
What if they are part of a general communication network ?



Applications

- Secure multiparty function computation
- Secure key distribution
- General Byzantine agreement between all nodes
- Archival storage
- Generating common random number across a network
- Proactive secret sharing

Literature

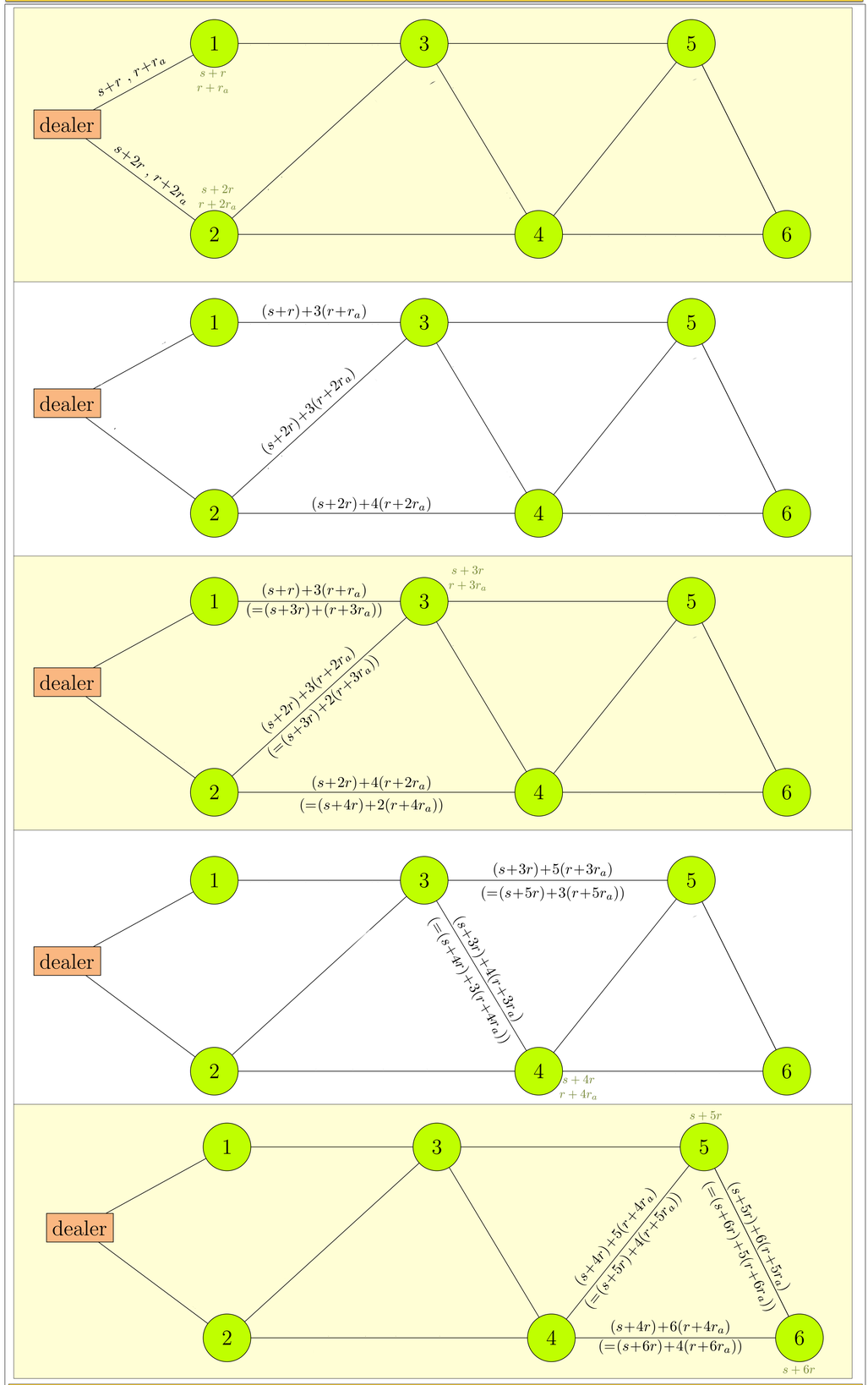


- Using pairwise agreement protocols (above)
- Another option: network coding
  - Eavesdropping nodes: hard

New Algorithm

- Distributed
- Deterministic (guaranteed)
- Communication optimal
- Computation efficient
- Distinctive instance of a network-coding algorithm that is both distributed and deterministic
  - Solution to nodal eavesdropping
- Works for a wide subclass of networks

Toy Example of the Algorithm



References

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