Network-Coding with *Tetrys* : On-the-fly, convolutional coding for the erasure channel

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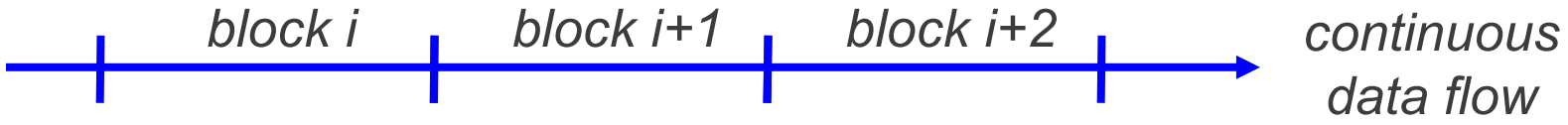
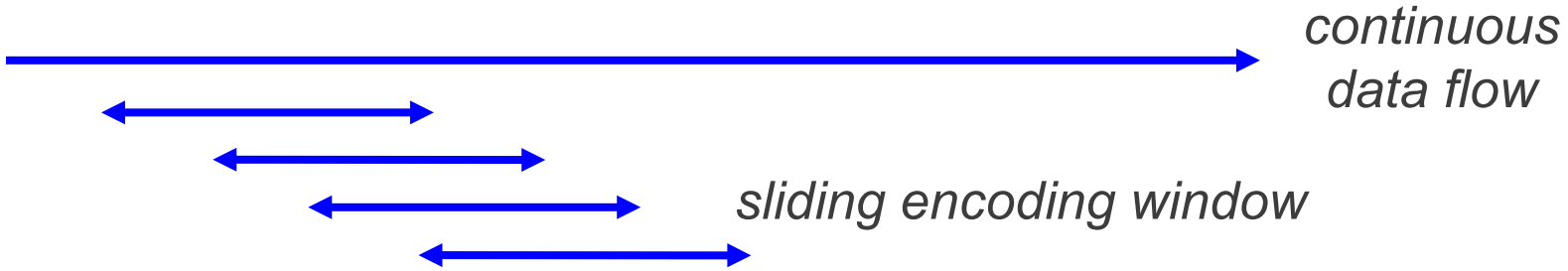
Convolutional Network-Coding

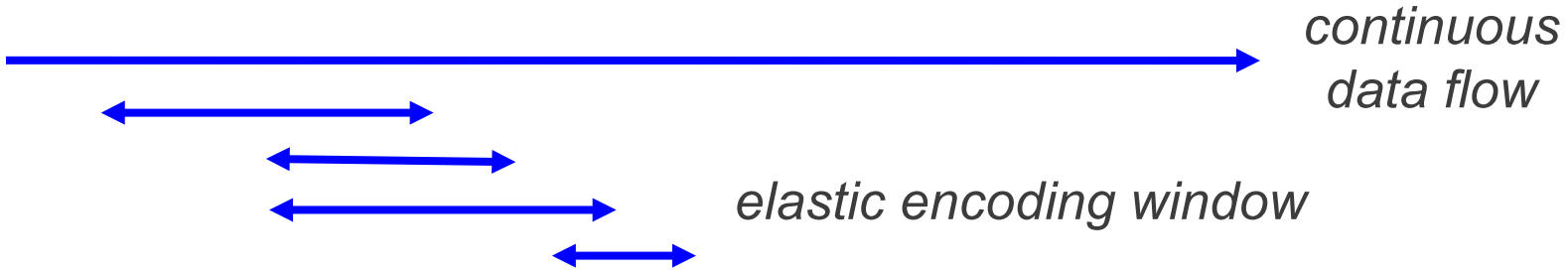
- **Blocks FEC Coding :**



- **Sliding encoding window :**



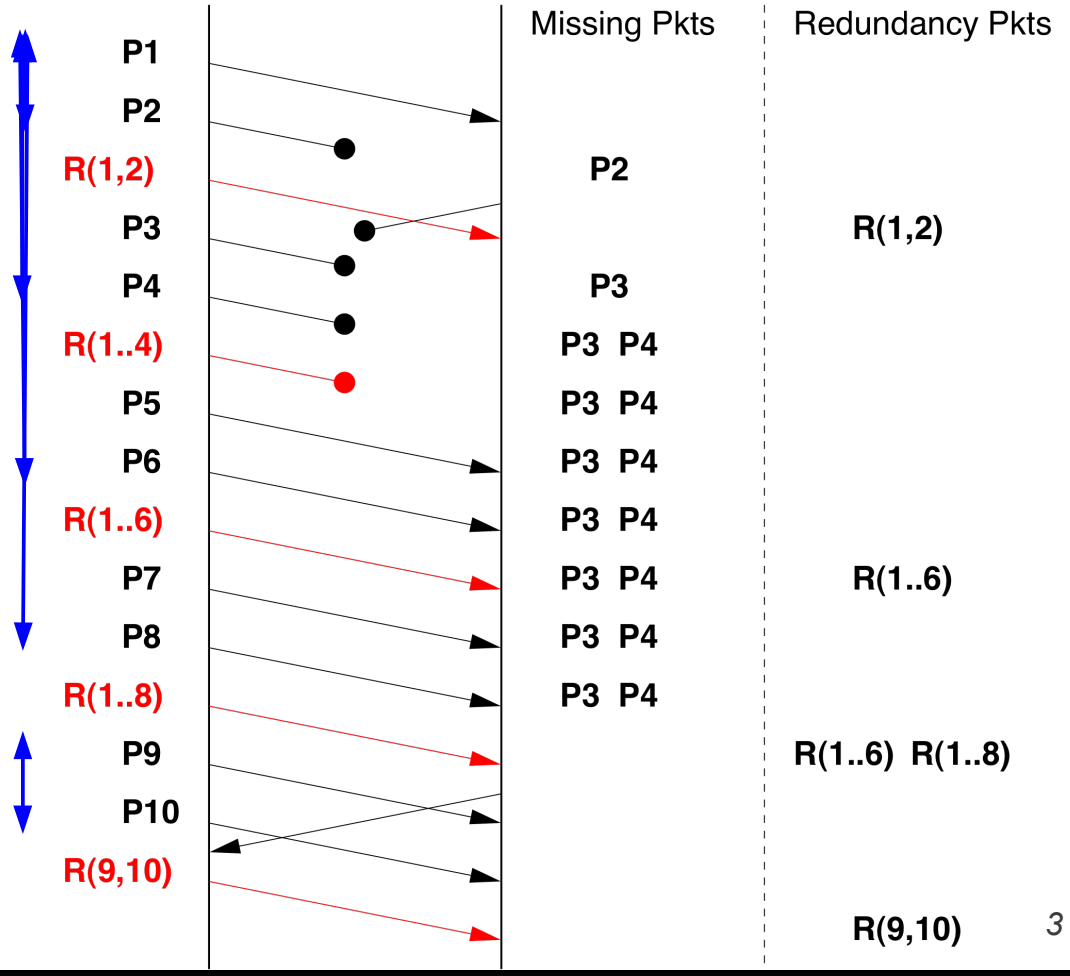
- **Tetrys, elastic encoding window**



Convolutional Network-Coding

- The encoding window can be adjusted depending on the feedback

code rate :2/3



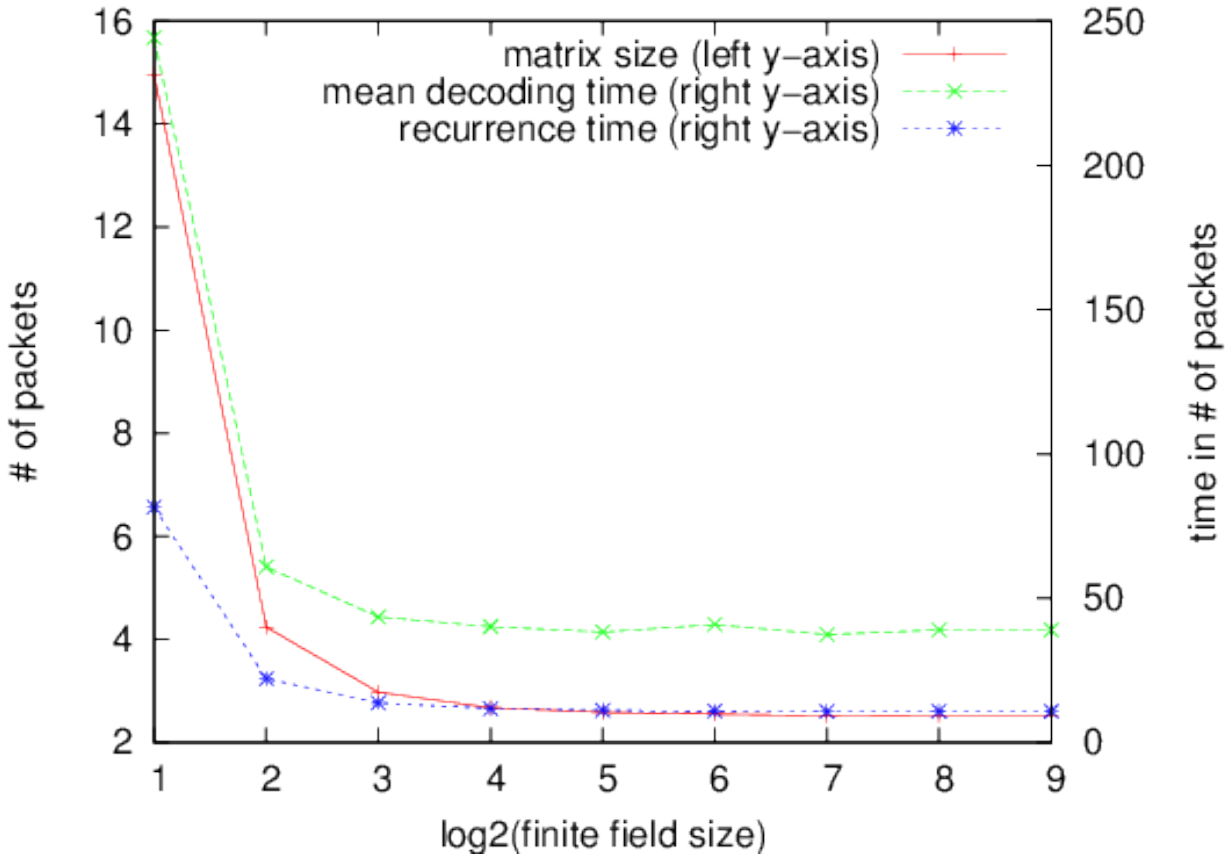
Convolutional Network-Coding

- **Blocks FEC Coding :**
  - > burst erasure protection increases with the block size
  - > as well as the encoding/decoding complexity
  - > there are limits on the block size with real time flows
- **Sliding encoding window :**
  - > same complexity and same recovery time if +/- losses
- **Tetrys, elastic encoding window :**
  - > full reliability is achievable
  - > the recovery delay is **independent of the RTT**
  - > recovery delay easily adjustable with the code-rate

Tetrys in details

- **Impact of the finite field size on the decoder :**

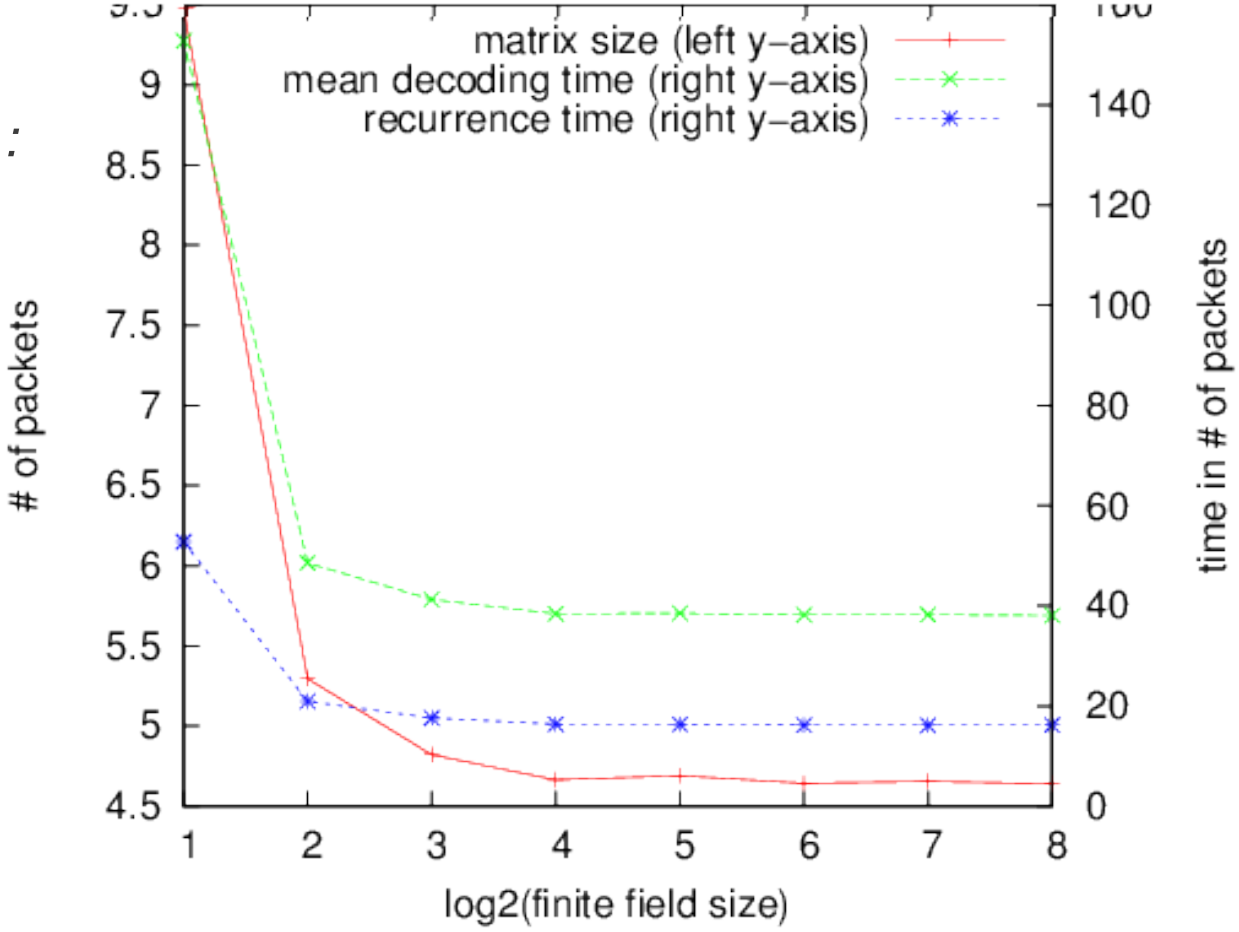
  - *Bernoulli channel :*
    - ***PLR** = 20 %*
    - *R = 2/3*



Tetrys in details

- **Impact of the finite field size on the decoder :**

- *Gilbert-Elliot channel :*
  - ***PLR** = 20 %*
  - *R = 2/3*
  - *Average erasure burst size = 3*



Fields of application

- **Real time transmissions**
  - Video-conferencing
- **Delay Tolerant Networking**
  - On going discussion with the DTNRG (IRTF)
- **Reliable UDP tunnel**
  - See the demo (with Tetrys Release 2.0 and TUNTAP module)
- **Reliable multicast**

Demo with the Tetrys API

- **Simple API using callbacks system**
  - Tetrys automatically manages encoded/decoded packets
  - Source packets can have a variable size (up to 64 kB)
- **Easy to integrate Tetrys inside existing code**
  - VLC integration
  - TUNTAP usage
- **Can get some [en|de]coding statistics**
  - Matrix size, memory usage, ...

Questions ?

- ***See for further details :***
  - *http://websites.isae.fr/tetrys*