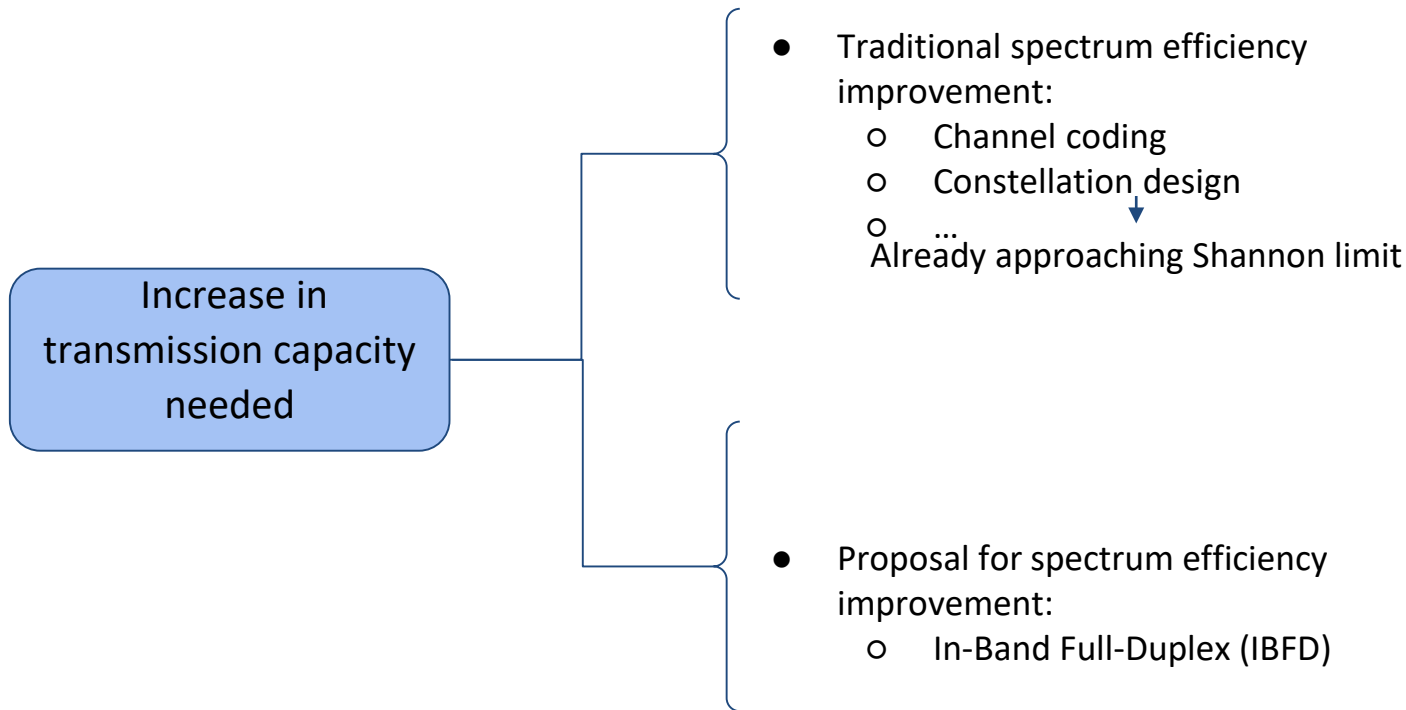

AI-BASED SIGNAL PROCESSING FOR FULL-DUPLEX IN 6G: THE ALTERNATIVE FOR MAXIMIZING SPECTRUM EFFICIENCY

Iñigo Bilbao

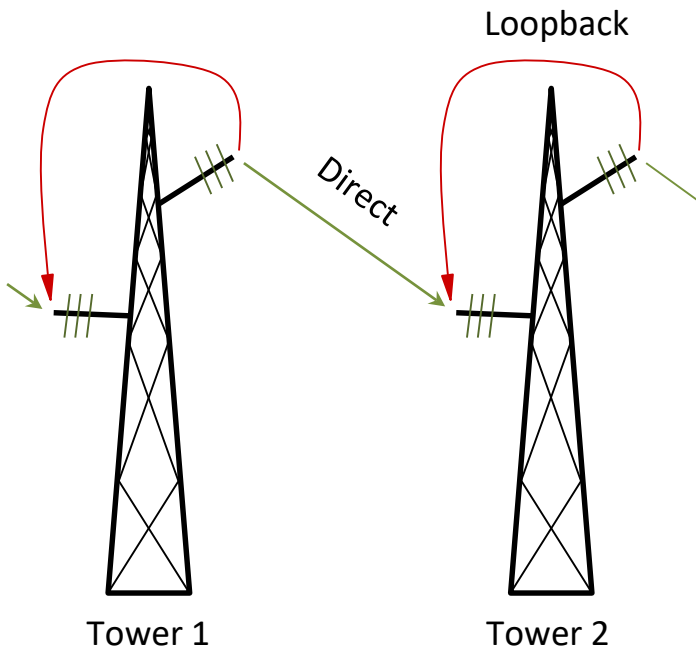
University of the Basque Country, Department of Communications Engineering
inigo.bilbao@ehu.eus

Introduction (I/II)





Transmitting and receiving at the same frequency and
at the same time.



Pros

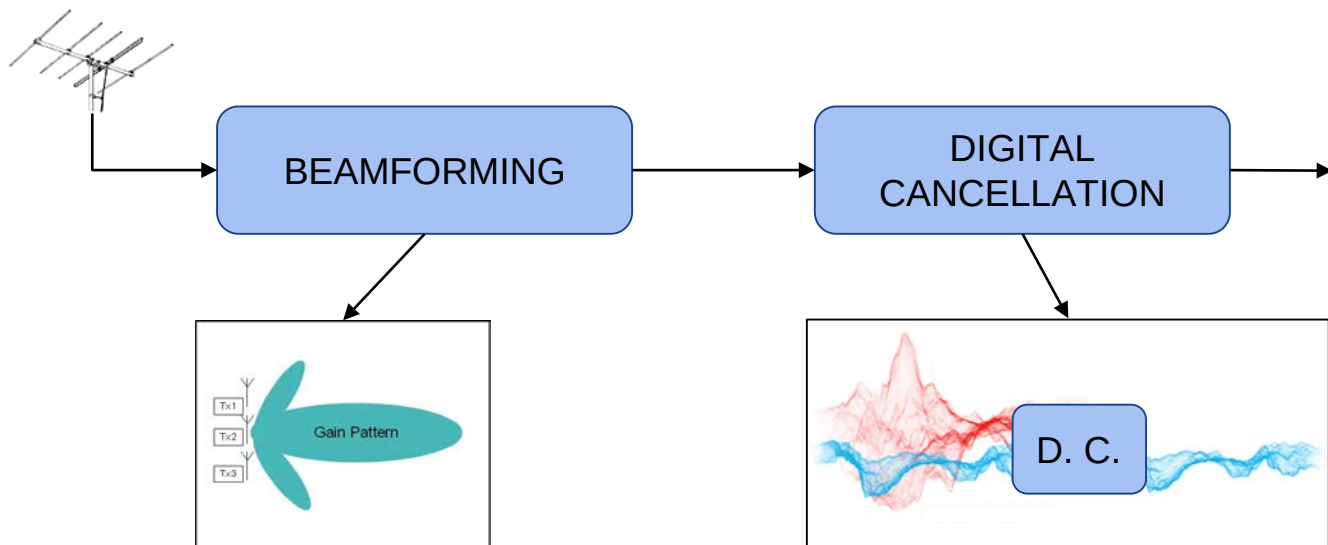
Doubles the spectral efficiency
compared with half-duplex systems

Cost reduced when compared to
other alternatives

Challenge

Loopback signal leakage

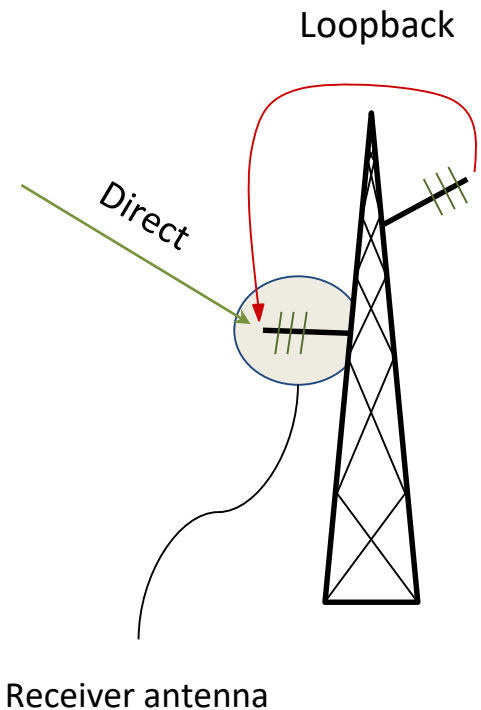
IBFD loopback reduction



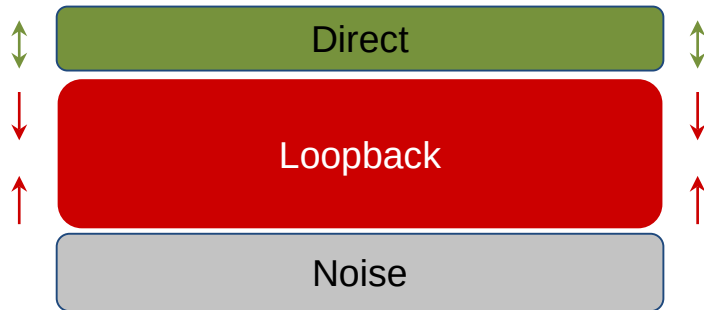
Modification of the radiation pattern of receiver antenna

Reduction of the leaked loopback signal

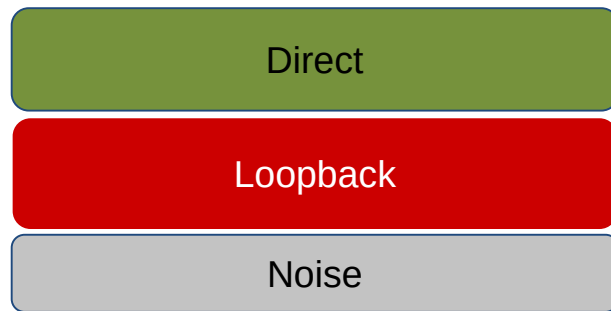
Beamforming (I/II)



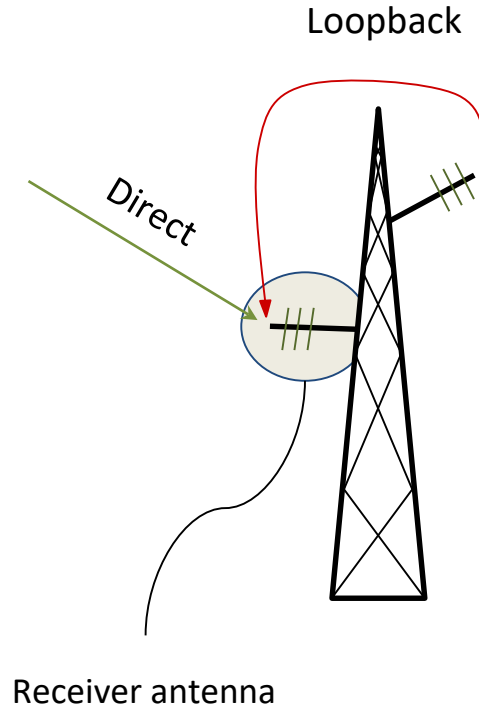
Without
beamforming



With
beamforming



Beamforming (II/II)



Direct

Loopback

CLASSICAL METHODS:

MMSE:

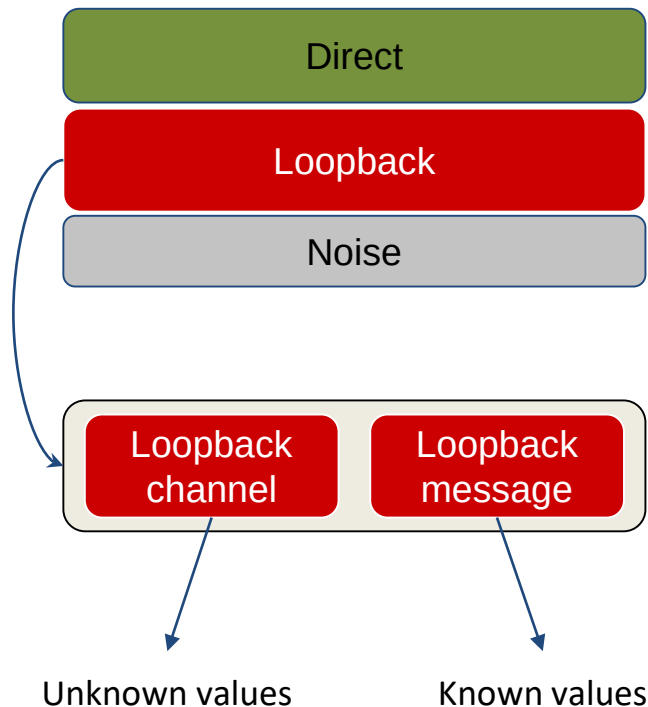
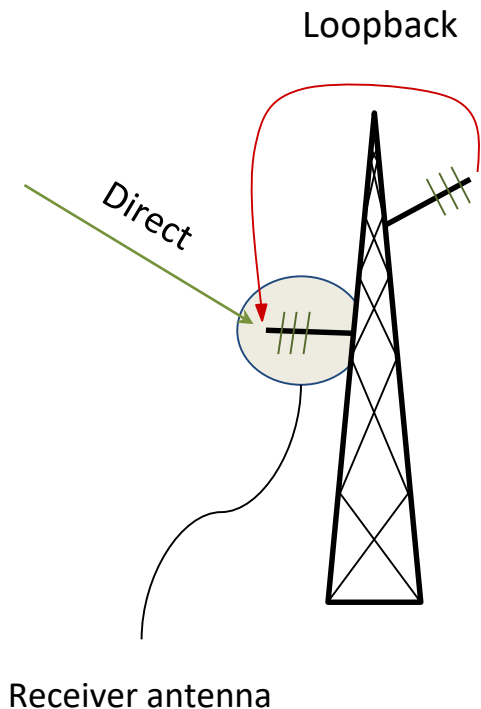
- Not optimum solution.
- Computationally very demanding.

AI METHODS:

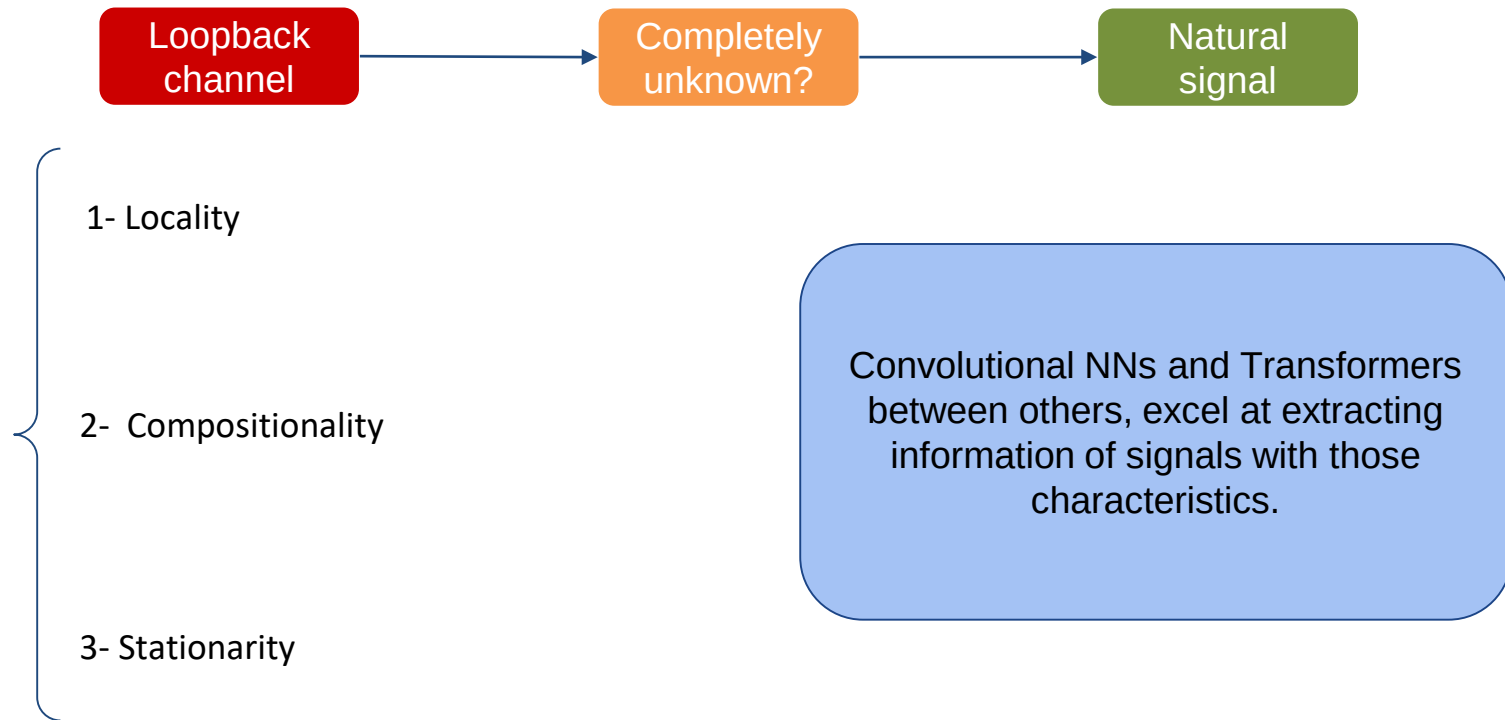
Reinforcement:

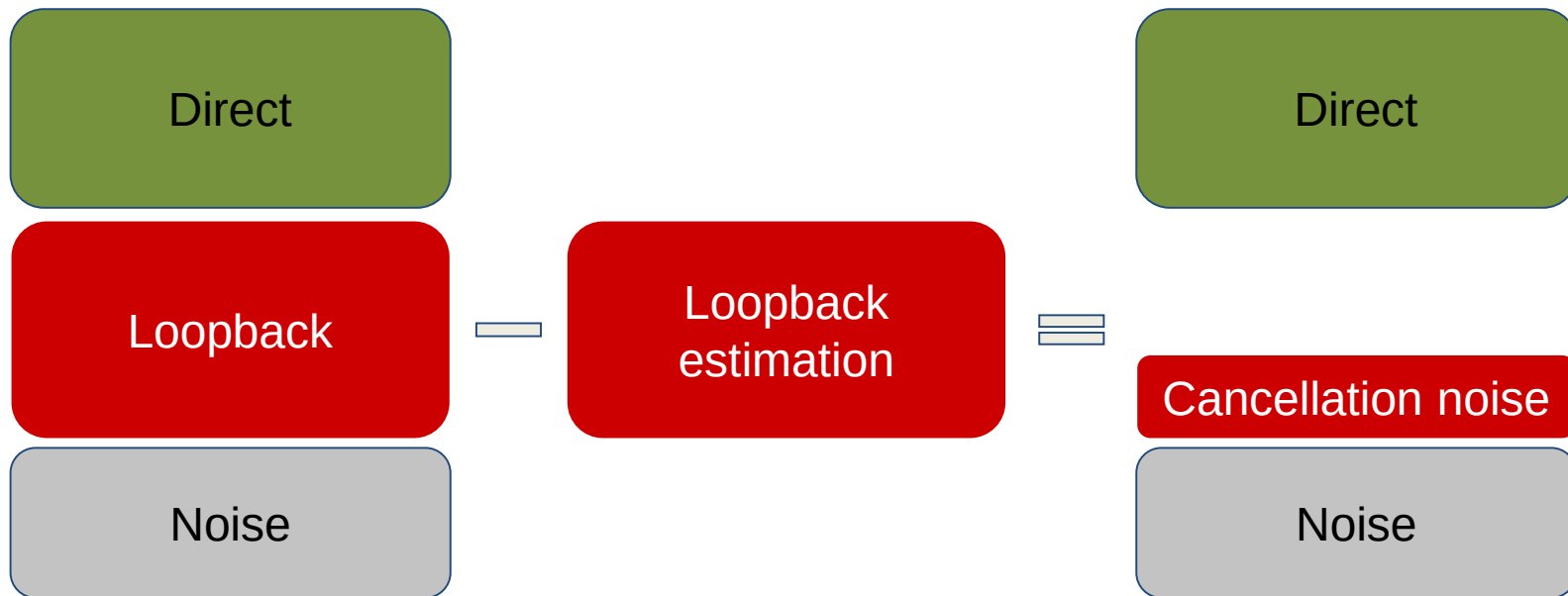
- Seeks dynamically for a solution.
- More optimized for certain hardware.

Digital cancellation (I/III)



Digital cancellation (II/III)





Conclusions

We propose AI-aided IBFD for spectrum efficiency improvement

BEAMFORMING

- Reinforcement learning
- CNNs and Transformers

DIGITAL CANCELLATION

- Supervised learning
- CNNs and Transformers

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