

Partial Soft Decode and Forward

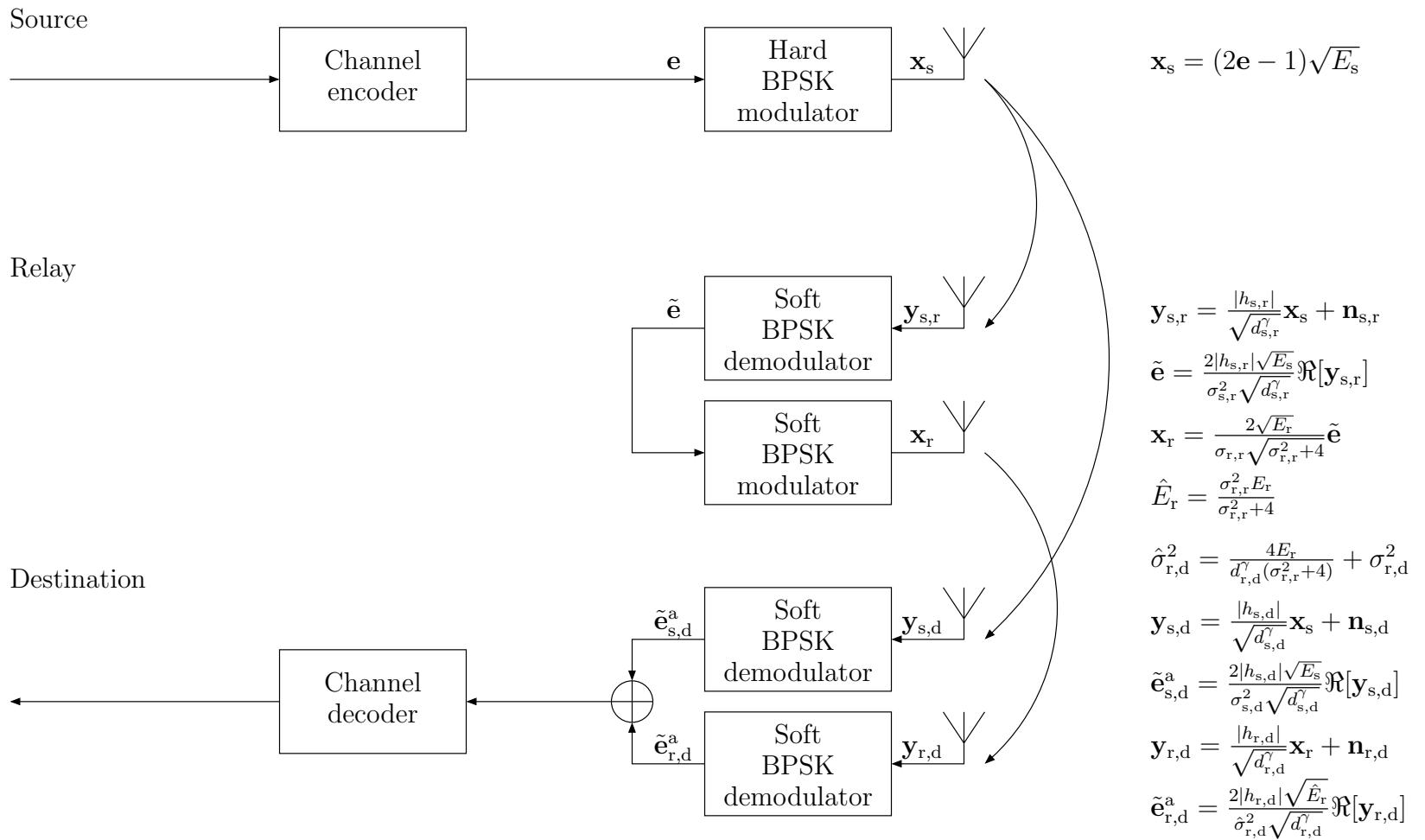
Pir S. Ahmed (Comsats, Abbottabad)
Robert G. Maunder
Lajos Hanzo

Rob Maunder
7 September 2011

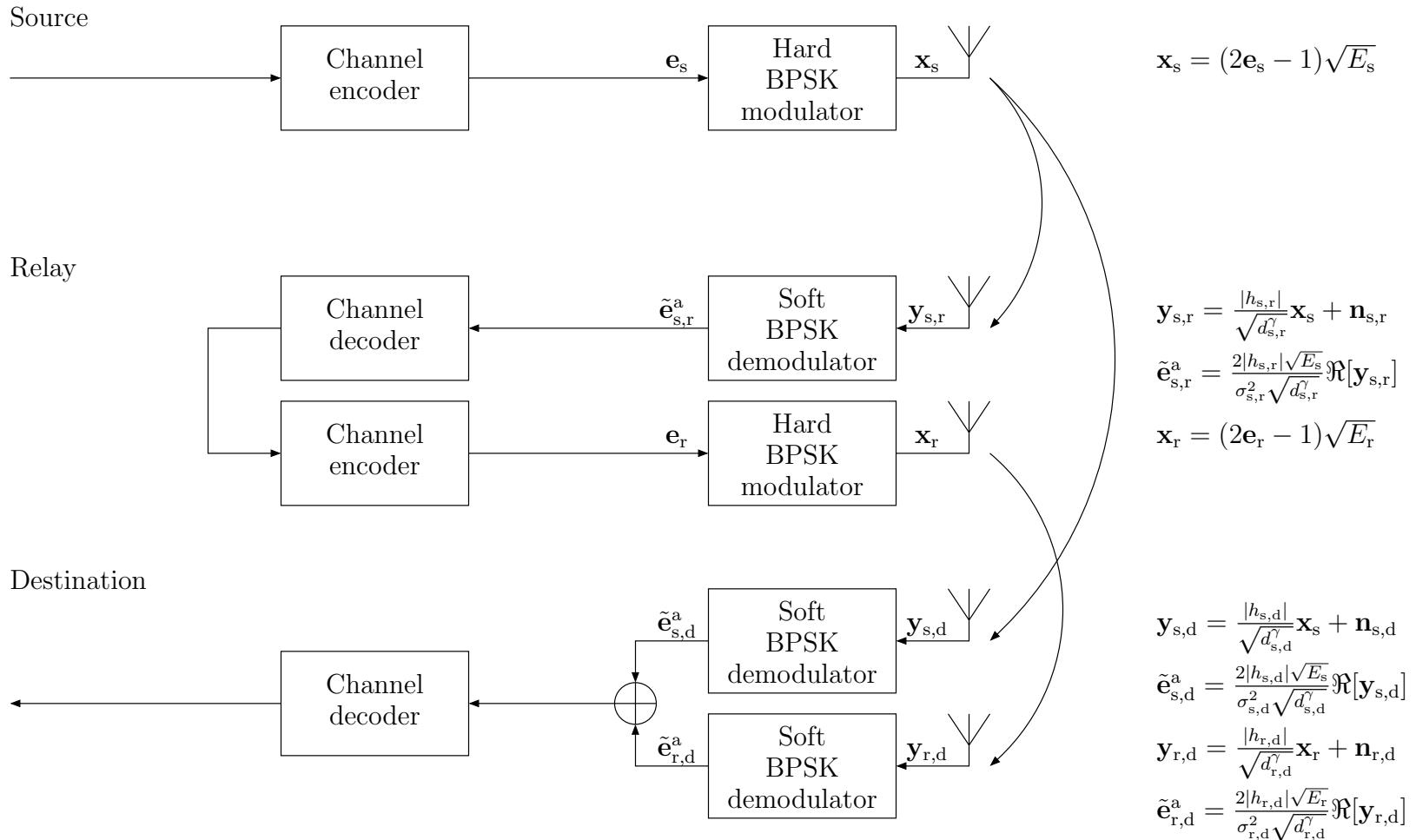
Overview

- Amplify and forward
- Decode and forward
- Distributed turbo code
- Soft decode and forward
- Partial soft decode and forward
- Comparison

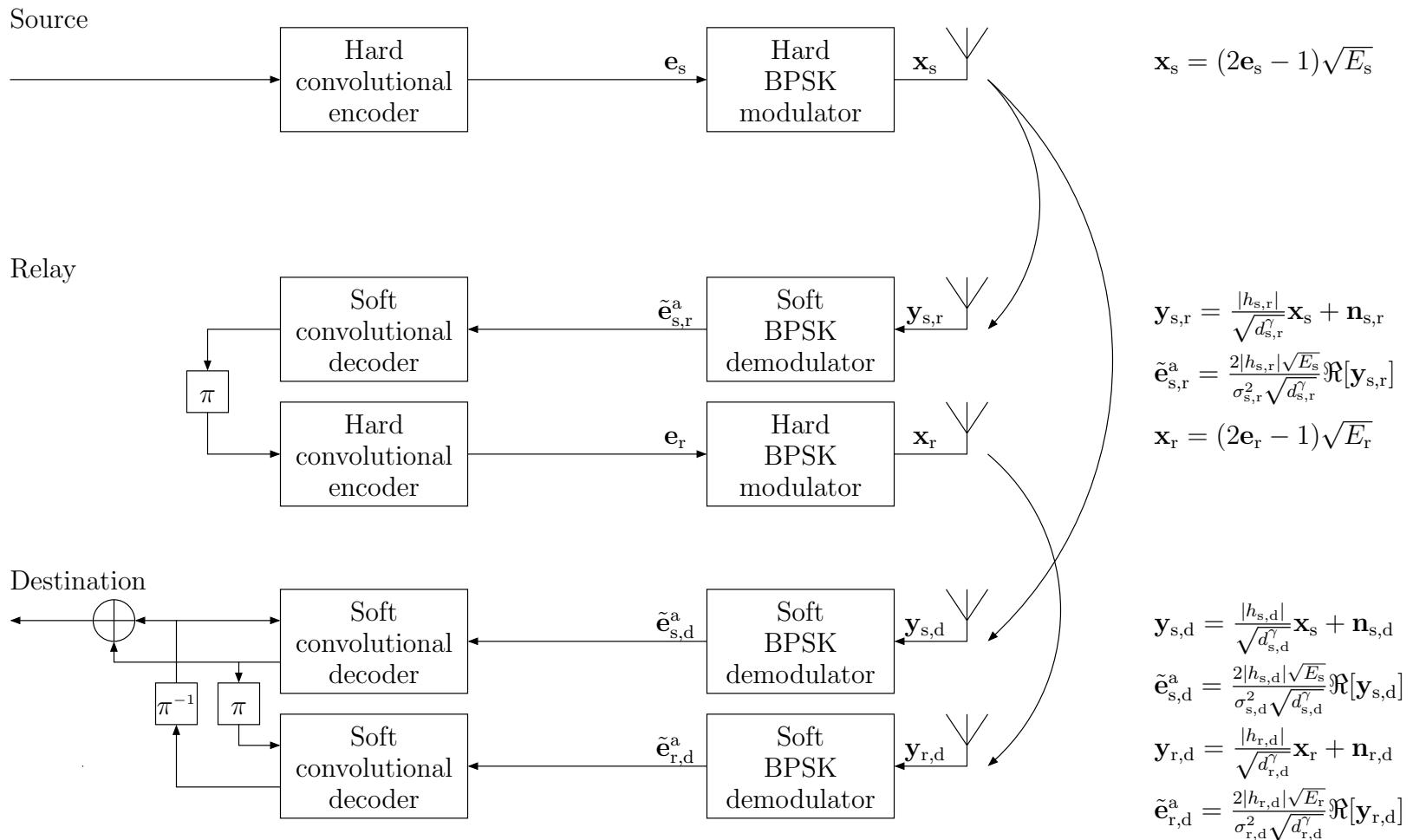
Amplify and forward



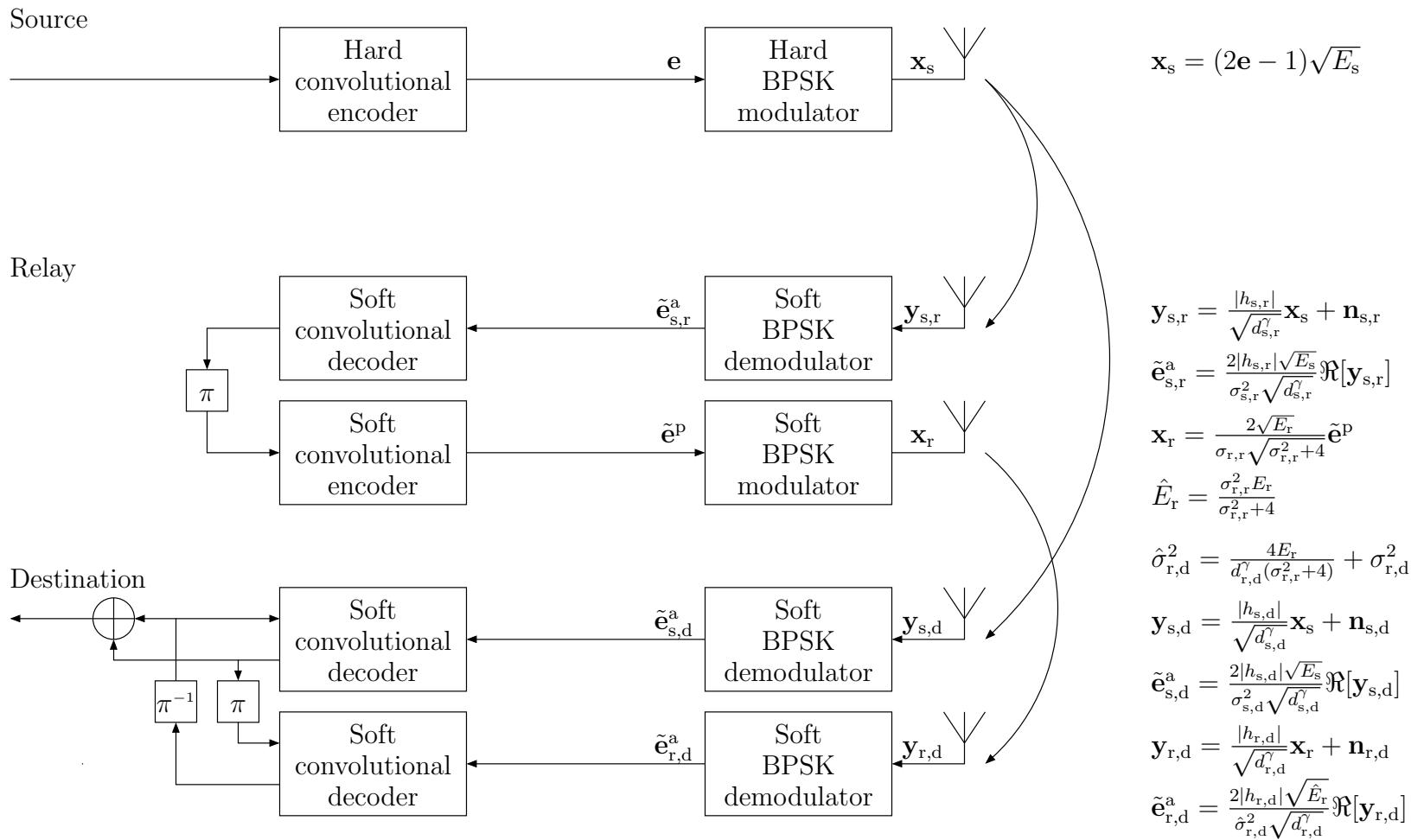
Decode and forward



Distributed turbo code

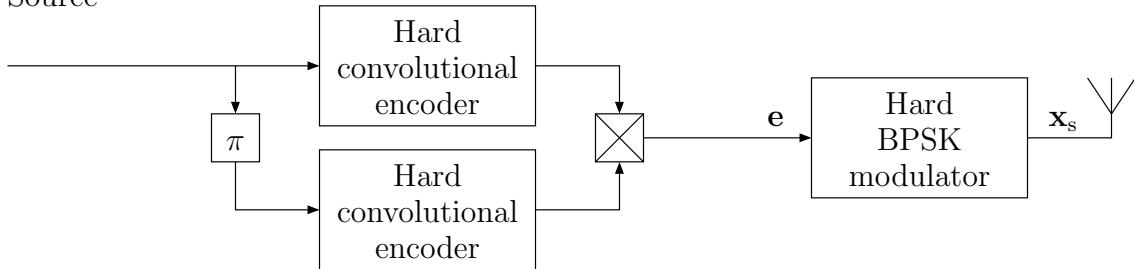


Soft decode and forward



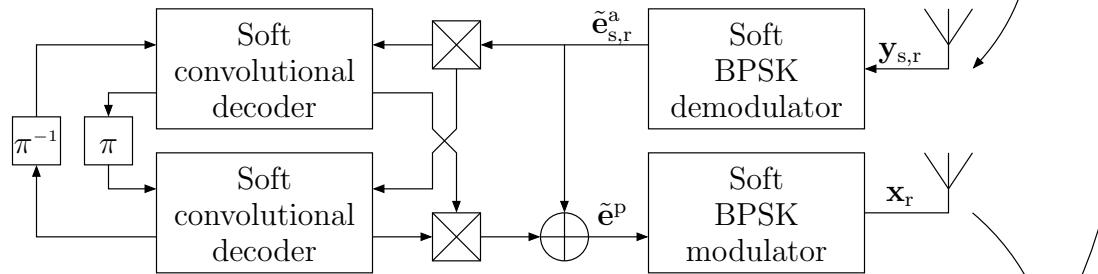
Partial soft decode and forward

Source



$$x_s = (2e - 1)\sqrt{E_s}$$

Relay



$$y_{s,r} = \frac{|h_{s,r}|}{\sqrt{d_{s,r}^{\gamma}}} x_s + n_{s,r}$$

$$\tilde{e}_{s,r}^a = \frac{2|h_{s,r}|\sqrt{E_s}}{\sigma_{s,r}^2 \sqrt{d_{s,r}^{\gamma}}} \Re[y_{s,r}]$$

$$x_r = \frac{2\sqrt{E_r}}{\sigma_{r,r} \sqrt{\sigma_{r,r}^2 + 4}} \tilde{e}^p$$

$$\hat{E}_r = \frac{\sigma_{r,r}^2 E_r}{\sigma_{r,r}^2 + 4}$$

$$\hat{\sigma}_{r,d}^2 = \frac{4E_r}{d_{r,d}^{\gamma}(\sigma_{r,r}^2 + 4)} + \sigma_{r,d}^2$$

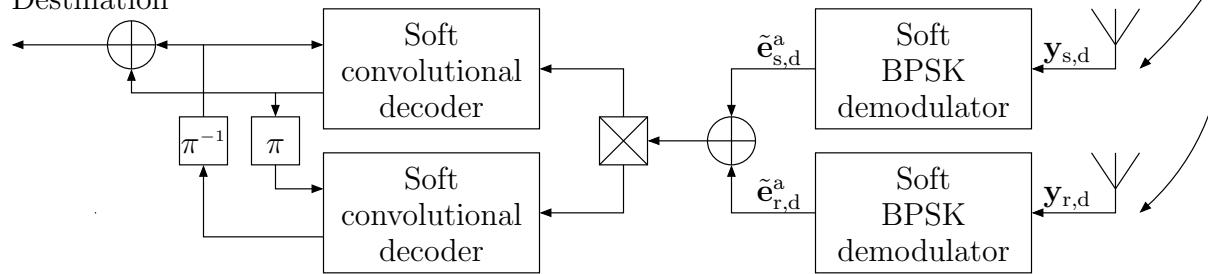
$$y_{s,d} = \frac{|h_{s,d}|}{\sqrt{d_{s,d}^{\gamma}}} x_s + n_{s,d}$$

$$\tilde{e}_{s,d}^a = \frac{2|h_{s,d}|\sqrt{E_s}}{\sigma_{s,d}^2 \sqrt{d_{s,d}^{\gamma}}} \Re[y_{s,d}]$$

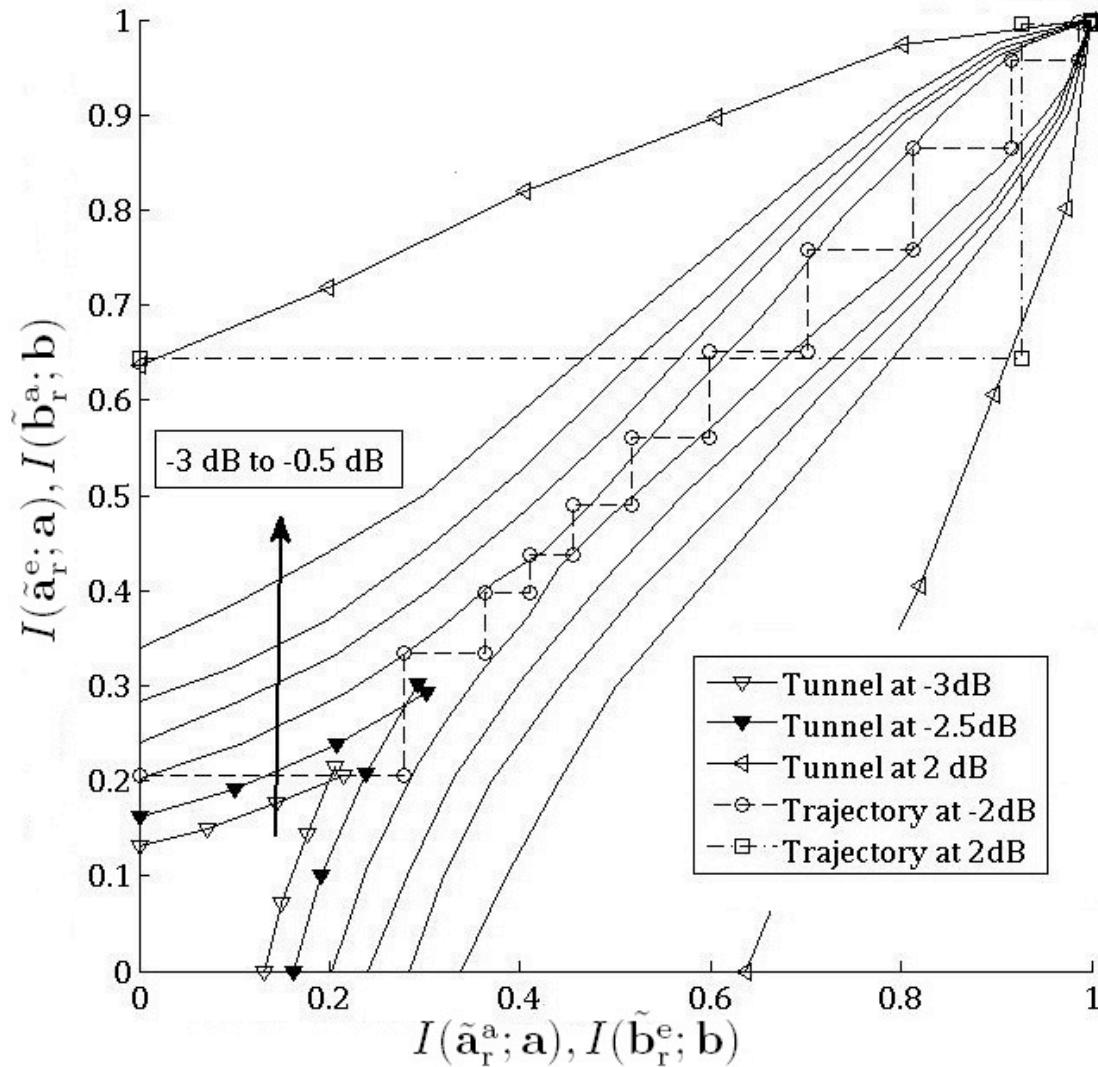
$$y_{r,d} = \frac{|h_{r,d}|}{\sqrt{d_{r,d}^{\gamma}}} x_r + n_{r,d}$$

$$\tilde{e}_{r,d}^a = \frac{2|h_{r,d}|\sqrt{\hat{E}_r}}{\hat{\sigma}_{r,d}^2 \sqrt{d_{r,d}^{\gamma}}} \Re[y_{r,d}]$$

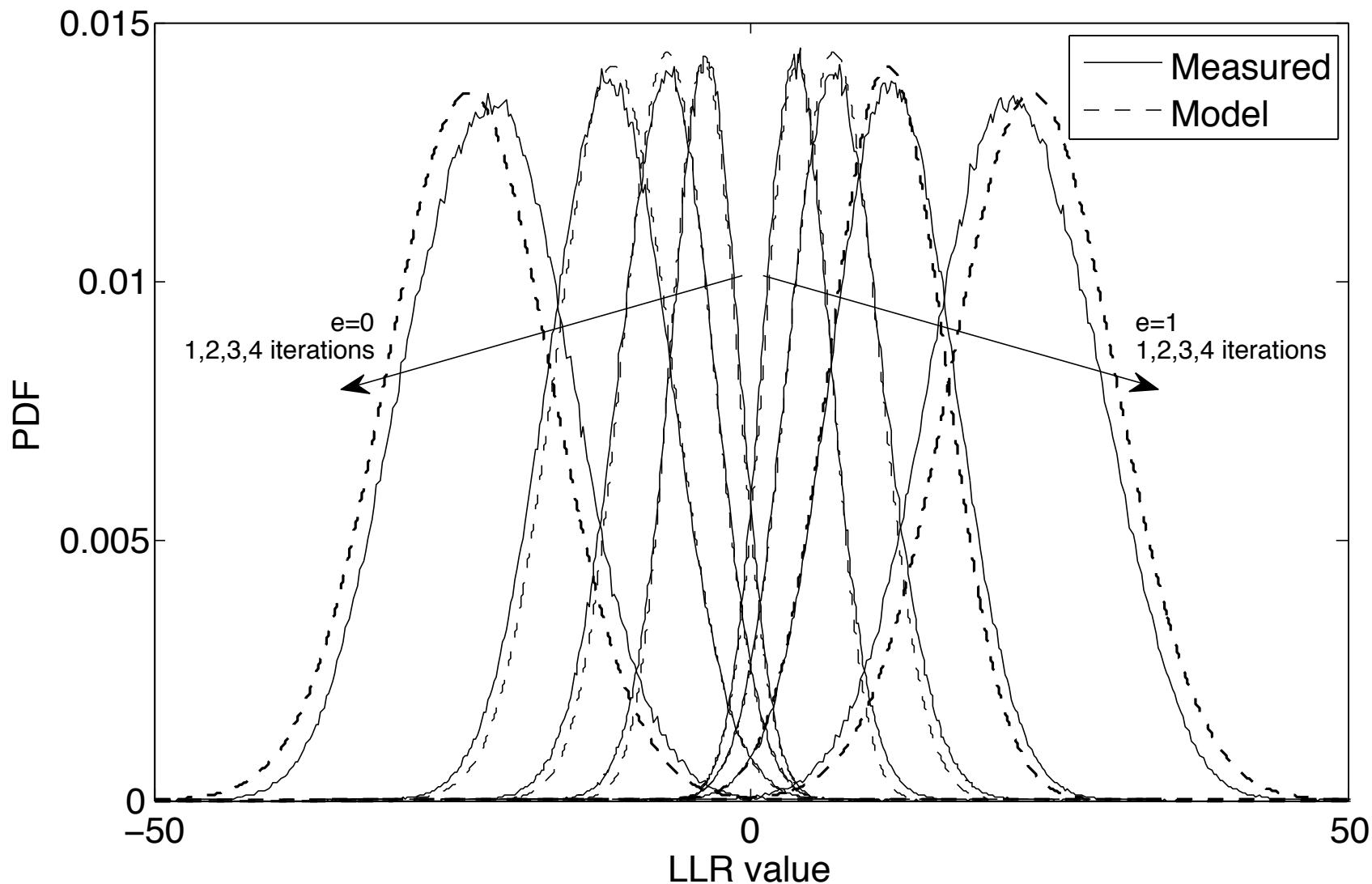
Destination



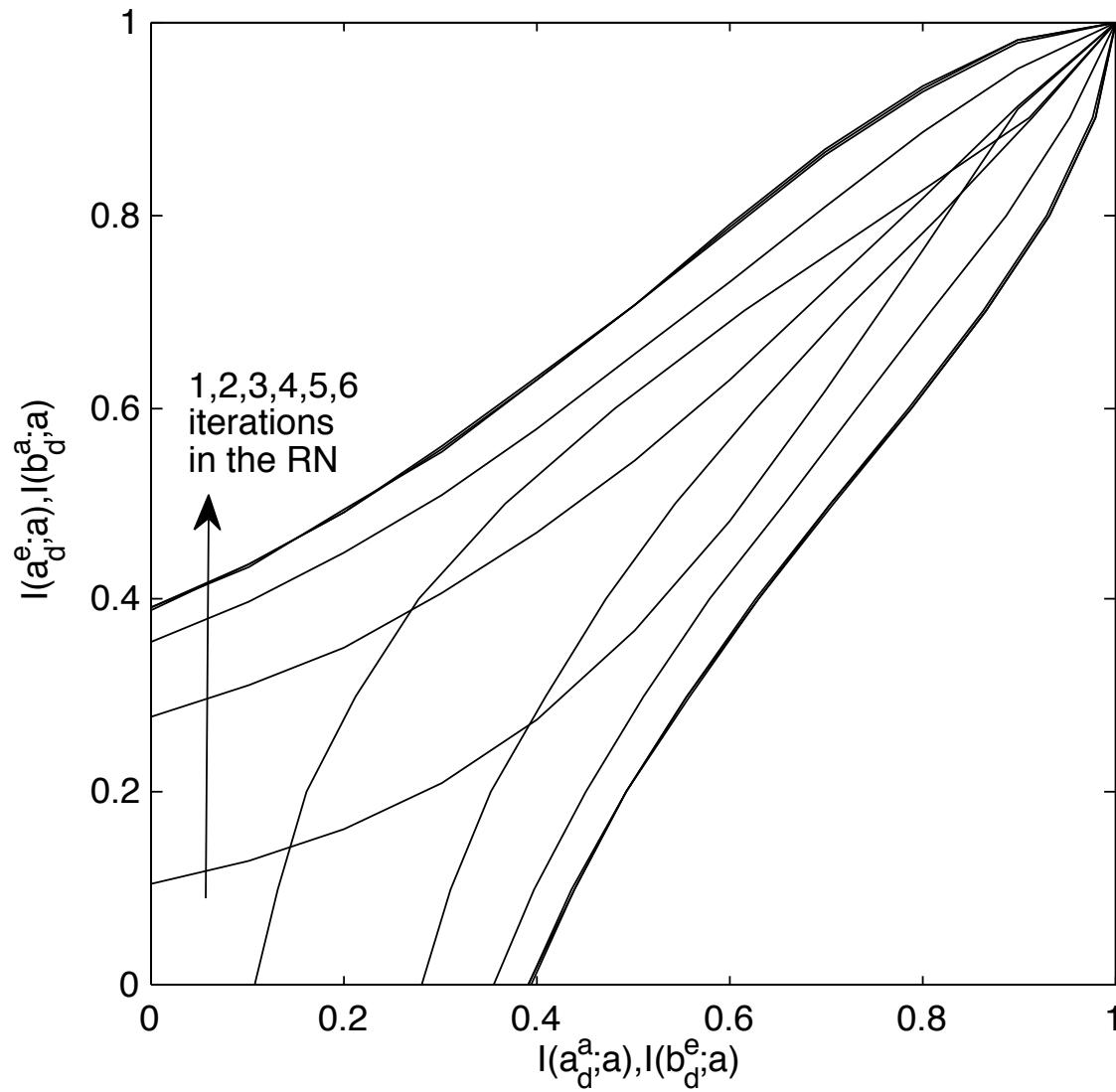
Relay EXIT chart



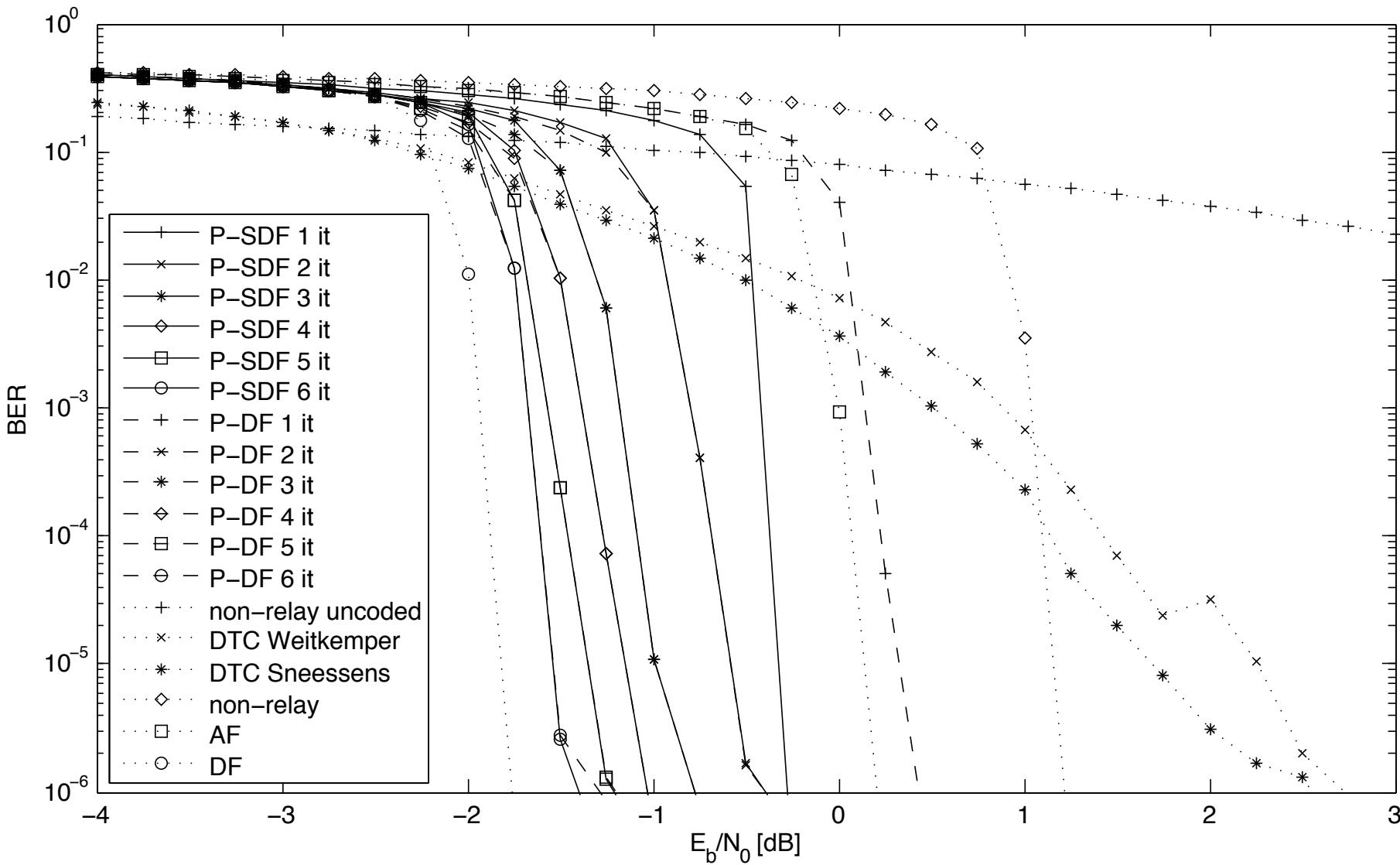
Relay LLR distribution



Destination EXIT chart



BER results



Thank you!