$$VT16 - EP2200$$
Project I - Error Control in Relay Networks
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Theoretic Analysis

1   AF relaying with end-to-end ARQ

$$\lambda_2 = \lambda_1(1 - p_{e,1})$$
$$\lambda_3 = \lambda_2(1 - p_{e,2}) = \lambda_1(1 - p_{e,1})(1 - p_{e,2})$$
$$\cdots$$

$$\lambda_{r+1} = \lambda_r(1 - p_{e,r}) = \lambda_1 \prod_{k=1}^{r}(1 - p_{e,k}), \text{ and, hence}$$

$$\lambda_0 = \lambda_1 \prod_{k=1}^{r+1}(1 - p_{e,k})$$

The success rate, or end-to-end probability of successful receipt of packets at the mobile station is hence

$$p_{s,e2e} = \prod_{k=1}^{r+1}(1 - p_{e,k})$$

and the end-to-end error probability is then

$$p_{e,e2e} = 1 - p_{s,e2e} = 1 - \prod_{k=1}^{r+1}(1 - p_{e,k})$$

2   DF relaying with end-to-end ARQ

3   DF relaying with hop-by-hop ARQ

Numerical Evaluation