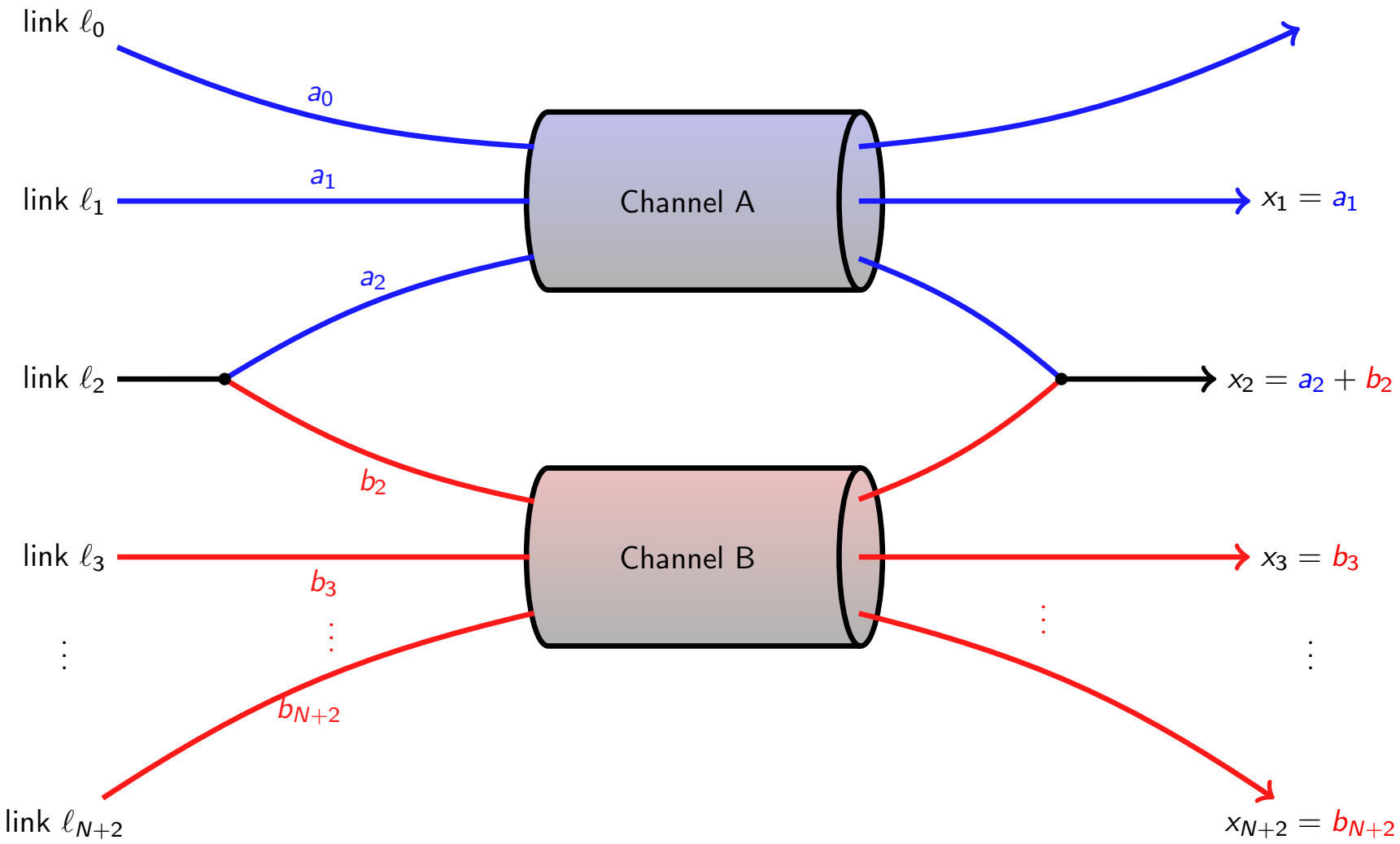
15.094J: Robust Modeling, Optimization, Computation

Lecture 14; Pareto Efficiency in Robust Optimization

Based on Iancu and Trichakis, Pareto Efficiency in Robust Optimization, 2012

Outline

A Communication Example



A Communication Example, continued

- Links $\ell_1, \ldots, \ell_{N+2}$ are for emergency purposes, whereas link ℓ_0 is used for general purposes.
- x_i transmission rate of the emergency link ℓ_i, $i = 1, 2, \ldots, N+2$. We have

$$x_1 = a_1, \quad x_2 = a_2 + b_2, \quad \text{and} \quad x_i = b_i, \quad i = 3, 4, \ldots, N+2.$$

- f_i fraction of emergency transmission routed via link ℓ_i, $i = 1, 2, \ldots, N+2$. Net emergency transmission rate

$$f'x = \sum_{i=1}^{N+2} f_i x_i.$$

- Uncertainty set

$$\mathcal{U} = \left\{ f \in \mathbb{R}_+^{N+2} : e'f = 1 \right\}.$$

- Select rates x, a and b (in case of an emergency) so as to maximize the net emergency transmission rate.