Problem 2

Area A: freq response > bias setting (20 mW/1 Hz)
  23 mW/1 Hz

Area B: bias setting > freq response
  10 mW/1 Hz
  6.7 mW/1 Hz

Area C

\[
\text{ACE A} = -91.7\text{ MW} \quad \text{Not enough}
\]
\[
\text{ACE B} = -25\text{ MW} \quad \text{Too much}
\]
\[
\text{ACE C} = -33.5\text{ MW}
\]

All send increase signals
Let \( S = \{ x \in \mathbb{R}^n : Ax \leq b \} \) be a polyhedron.

**Problem 4**

Find the minimum of \( c^T x \) subject to \( Ax \leq b \).

**Constraints:**

- Linear flow
- Power flow
- Gen. limits
- Demand flow
- Gen. limits
- Convexity

If we introduce a new variable \( y \), then the piece-wise linear function is convex for all \( (x, y) \).
Problem 5

b) Larger Bias setting then the area will provide more than is needed.

3

c) Security refers to the ability to operate within system limits (thermal, stability) with respect to a set of contingencies (outages) usually single contingencies (n-1 security)