Probabilistic Analysis of Power and Temperature Under Process Variation

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Overview

* Process variation
* Uncertainty quantification
Process Variation

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Process Variation

Temperature

Safe

Time
Process Variation

Temperature

Safe

Time
Goal

* Power-temperature analysis considering process variation
Proposed Framework

1.

2.

3.

4.

5.
Uncertainty Quantification
Uncertainty Quantification
Monte Carlo
Monte Carlo

Uncertain → Certain → Uncertain
Solution
Polynomial Chaos
Polynomial Chaos
Polynomial Chaos

Certain

Certain

Certain
Power and Temperature

Process parameters -> System simulator --- Power and temperature
Quantities of Interest

* $f(\text{Power})$
* $g(\text{Temperature})$
* $h(\text{Power, Temperature})$
Reliability

Survival function

Lifetime
Design-Space Exploration

Minimize:

* \( f(\text{Quantities of interest}) \)

Such that:

* \( g(\text{Quantities of interest}) \)
Thank you! Questions?
