Weekly Report

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1 Initial idea on statistic model order reduction

When considering process violation, the matrices in the MNA equation become no longer deterministic. The MNA equation can be rewritten as:

$$\begin{aligned}(\widehat{G} + s\widehat{C})\widehat{x} &= Bu \\ \widehat{y} &= L^T\widehat{x}\end{aligned} \tag{1}$$

where the symbol^indicates random variables.

Traditional model order reduction techniques, like PRIMA, cannot deal with such kind of problems. The mean value of those random variables must be used for moment matching. However, such kind of projection cannot even guarantee the matching of mean moments, because the state variables and the G, C matrices are correlated.

There is a paper from CMU dealing with this problem, but their method are not very efficient, and also they still cannot guarantee the reduced model can closely match the statistical characteristics of the original system.

As we know, usually we can derive most of the system's statistical behavior, like confidence limits, by its expectation and variance. I am thinking of a method such that we can construct the projection matrix to preserve or closely match the expectation and variance of the output of the reduced system and the original system.

Once the algorithm is developed, we can use it to calculate the voltage bounce and other noises due to the process violation.

I will put the mathematical papers I have found related to this topic in the eda internal website soon.

2 Compile the Code from Jun

I have finished compiling and understanding the code on decoupling model and wcn model. I will finish the remaining codes before next Wednesday.

3 Set up the environment for chip measurement

I have installed the related software and read the related reference on the chip. I will start to draw the PCB next week.