Laboratory 1

Hamming Distances of Recent PUF

ECE 525 – Spring 2012

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For lab 1, we will be looking at the data collected over the last few months from an on-chip PUF. The data can be found on the class website and will need to be extracted from the compressed file format (as mentioned in class). The data is in two sets of files, the TGV_diffs (Transmission Gate Voltage, off-chip) and the VDCB_diffs (Voltage-Digital Converter, on-chip). The diffs indicate that the bias found in our measurements is already accounted for. Also, you will find that there are Nfet and Pfet type data. The Nfet is a stack of two NMOS pass-transistors and the Pfet is likewise a stack of two PMOS pass-transistors. The data was taken at nine temperature-voltage (TV) corners: 25C, 1.2V (nominal); 25C, 1.08V; 25C, 1.32V; -40C, 1.2V; -40C, 1.08V; -40C, 1.32V; 85C, 1.2V; 85C, 1.08V; 85C, 1.32V.

First, from the given data sets, construct bit strings representing comparisons between neighbor elements. A 1 will represent that the first value is greater than the second and a 0 will represent that the first value is less than the second. Next, calculate the intra-chip hamming distance between all possible combinations of TV corners per chip. Lastly, calculate the inter-chip hamming distance between all possible chips at the nominal TV corner.

Submit a 1-2 page report on your findings and observations, graphs are welcomed.