**International Institute of Information Technology, Hyderabad**

**CVEST**

**Introduction to VLSI (ECE361) & Advanced VLSI, Spring 2013**

**Assignment-2**

**Due: Mon., 28-1-2013**

# CMOS INVERTER CHARACTERISTICS IN THE PRESENCE OF PROCESS VARIATION

## Problem-1

Design a CMOS inverter with $\frac{W_P}{L_P}$= K$\frac{W_N}{L_N}$ and K=3 and obtain its transfer characteristics. Analyse the Noise Margins($NM_H$ and $NM_L$) of the designed inverter for typical process corners.

## Problem-2

Analyse the Noise Margins for (a) Slow and (b) Fast process corners.

## Problem-3

1. Perform Monte Carlo simulations for variations in the W, L, $V_{th}$.
2. Perform mismatch analysis for different values of 'K'.

## Problem-4

Analyse the effect of supply voltage scaling(by 10 %) on the inverter's characteristics.

## Tools and Technology

You will be using LTSPICE or other tools for the simulations using 90nm MOS corner models.

## Deliverables

A pdf document containing

1. A brief write up on the theoretical analysis of the problem.
2. Circuit schematics and SPICE results (graphs) along with your detatiled observations on the results.