ANALOG IC DESIGN COURSE PROJECT

Date of submission: 9/4/24

Objectives:

Design a 2-stage Op-amp in 180 nm technology targeting different applications.

1. High Gain
2. High Gain Band Width (GBW)
3. Low area
4. Low Power

General Specifications:

Supply voltage (VDD) = 1.8 V

Reference current source (I_{ref}) = 20 µA

Slew rate = 1V/µs

Phase margin >= 60^{o}

Load Capacitance (C_L) = 10pF

ICMR = 0.6- 1.4 V

1. Problem 1: High Gain

DC gain >= 75dB

GBW > = 10MHz

Pdiss < =1mW

Lmax <= 2µm

2. Problem 2: High Gain Band Width (GBW)

Gain >= 40dB

GBW >=70MHz

Pdiss< =1mW

Lmax <= 2µm

3. Problem 3: Low area(area should be minimum)

Gain >= 40dB

GBW >=10MHz

Pdiss< =1mW

Lmax <= 2µm

4. Problem 4: Low Power (Power should be minimum)

Gain >= 40dB

GBW >=10MHz

Pdiss< =0.25mW

Lmax <= 2µm

Analysis:

1. DC Analysis
   a. Report the schematic of the diff pair with DC OP point annotated: Id, Vgs, Vds, Vth, Vdsat, gm, gds, gmb, region.
   b. Check that all transistors operate in saturation.

2. AC Analysis.
   a. Observe pole-zero analysis of your circuit.
   b. Frequency response of your circuit.
   c. Find Av, PM, Bandwidth, CMRR, PSRR.
   d. Give a proper reason for selecting any value of any parameter.

3. Transient Analysis.
   a. slew rate.
   b. ICMR, OCMR.

EE517 Analog VLSI Lab-(Jan-May 24)-project				
Sl. No	**Roll**	**Name**	**batch**	**Topic**
1	234102406	Chandan Bordoloi	Batch1	Problem1 : LM OTA : gain optimisation
2	234102407	Charugundla Sai Bharath	Batch1	
3	234102408	Deepika S	Batch1	
4	234102409	Harsh Kumar Tiwari	Batch1	
5	234102421	Prajakta Arvind Wakde	Batch2	Problem 4: LM OTA :Power optimisation
6	234102422	Saurabh kumar	Batch2	
7	234102410	Kartali Chanukya	Batch2	
8	234102412	Kotapati Vamshi Krishna	Batch2	
9	234102414	Pushpendra Gurjar	Batch3	Problem 3 : LM OTA:Area optimisation LM
10	234102417	Soham Kundu	Batch3	
11	234102418	Varunkumar Reddy Abbannagari	Batch3	
12	234102419	Ameen Mohammed	Batch3	
13	234102420	Gangala Venkata Sai	Batch4	Problem 2 :OTA :bandwidth optimisation
14	234102411	Kasi Viswanadham Naidu Bodepu	Batch4	
15	234102413	Nagendra Kundrapu	Batch4	
Total no: of students: 15				