Project 2

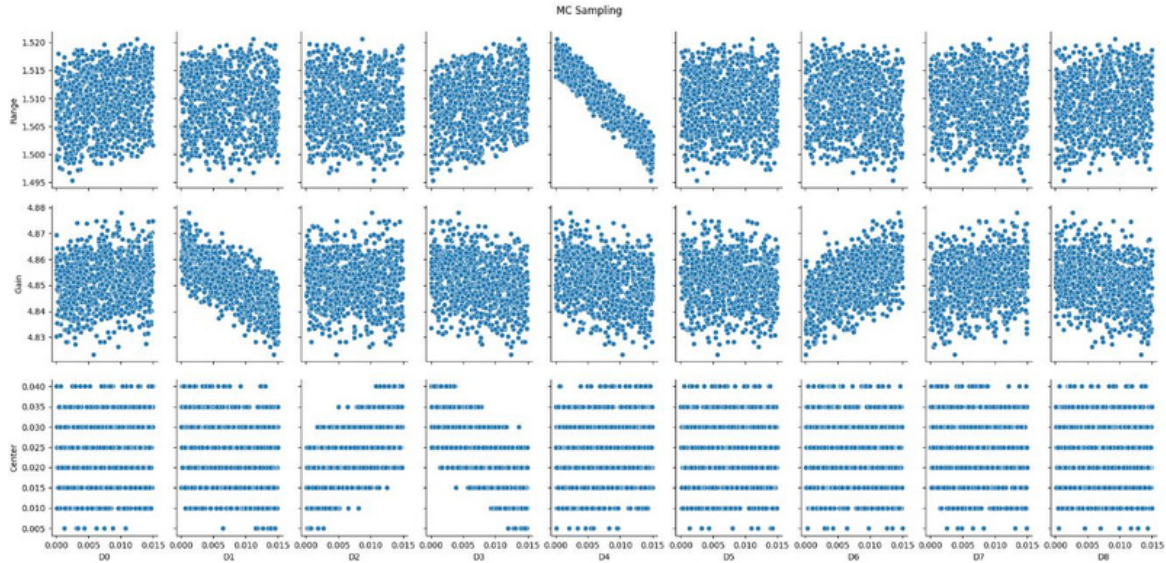## Deliverables for Project 2: Part 1

For power supplies ±0.9V

a:

Fig. 10. MC sampling of Range, Gain, And Center of size 1000 in the 9 VTH variations.

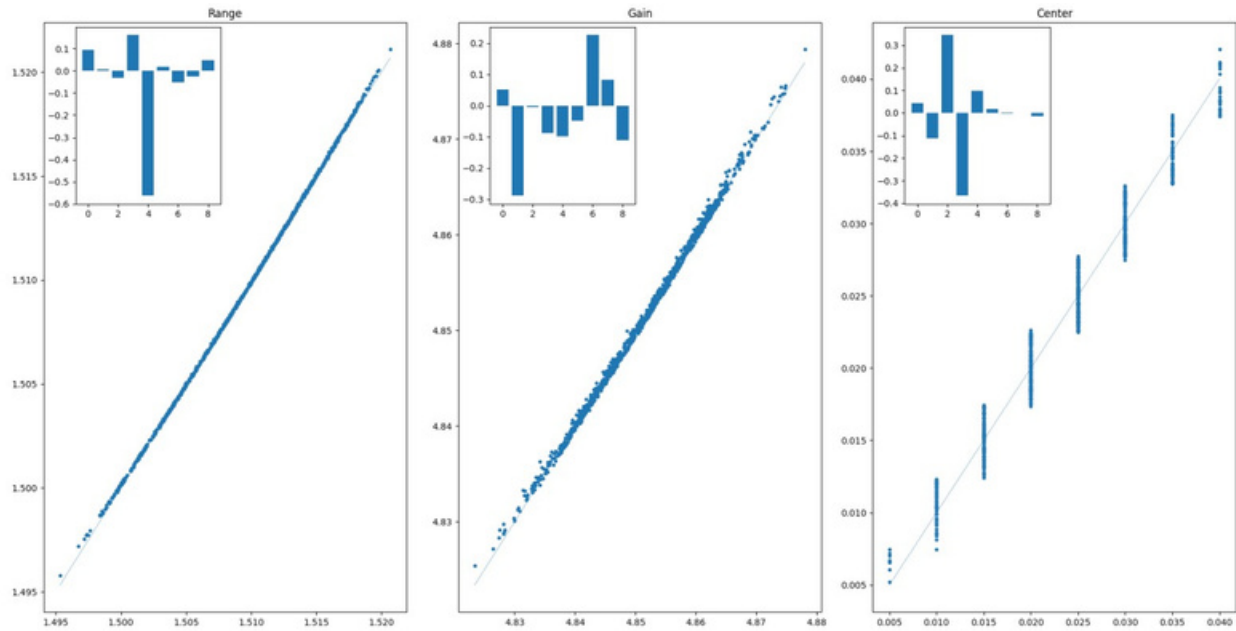
Fig. 11. Sensitivity of Range, Gain, And Center to a MC sample of size 1000 in the 9 VTH variations.

b:

	Parameters	D0	D1	D2	D3	D4	D5	D6	D7	D8
0	Range	0.0944523	0.00691583	-0.0314094	0.16126	-0.563895	0.0188662	-0.0516201	-0.0242317	0.0473496
1	Gain	0.0516831	-0.28906	-0.00568343	-0.0872801	-0.0981589	-0.0490092	0.225728	0.0822504	-0.111146
2	Center	0.0420123	-0.113194	0.344804	-0.367325	0.0976977	0.0183489	-0.00160977	-0.000181374	-0.0148264

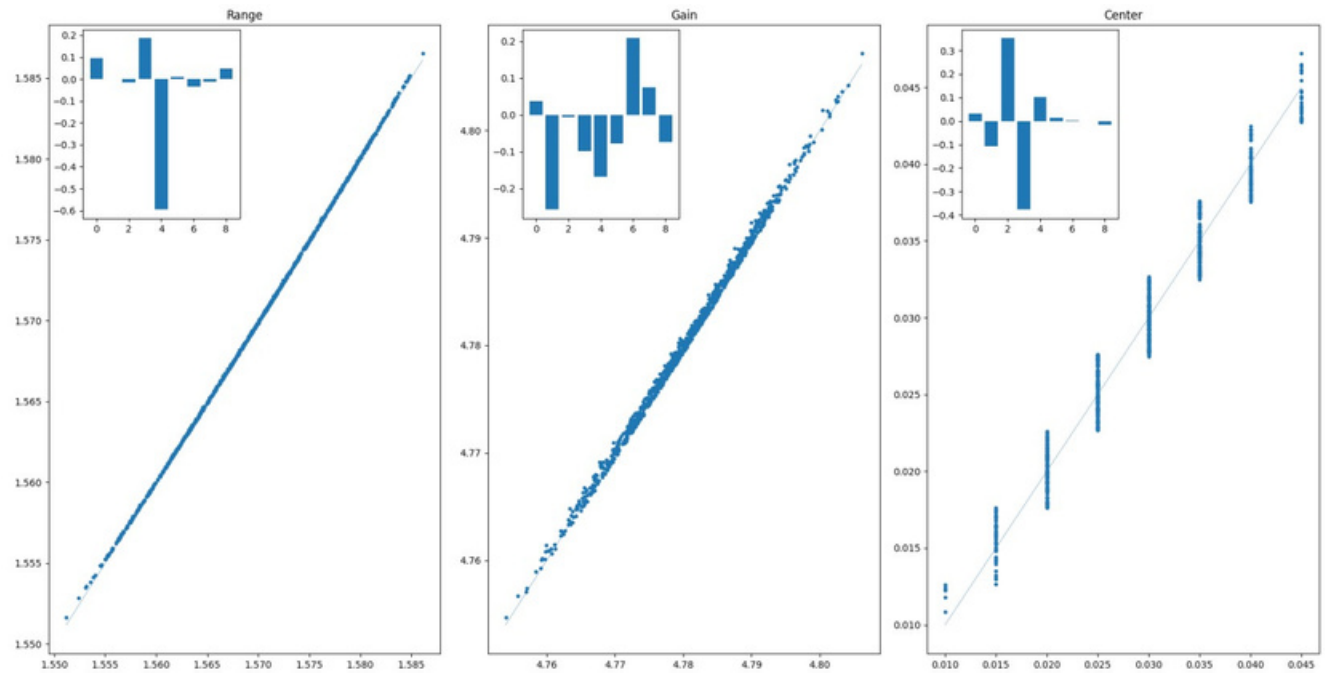# Deliverables for Project 2: Part 2

For power supplies ±1.0V

a:

Fig. 12. Sensitivity of Range, Gain, And Center to a MC sample of size 1000 in the 9 VTH variations

b:

Table: Sensitivity for power supplies ±1.0V

	Parameters	D0	D1	D2	D3	D4	D5	D6	D7	D8
0	Range	0.0958927	0.000956514	-0.0159377	0.185895	-0.596038	0.00917001	-0.034319	-0.0139151	0.0478762
1	Gain	0.0371329	-0.257426	-0.00541726	-0.0983135	-0.167894	-0.0768803	0.208036	0.0753806	-0.0735206
2	Center	0.0304059	-0.105869	0.352447	-0.377297	0.101511	0.0147998	0.00145728	-0.000578154	-0.0156343

C: To understand the performance clearly, the sampling sets are kept the same for both cases.

From the sampling set, the observation is that there is not any correlation among any pairs of performance, but in the case of parameters Range with D4 are negatively correlated. In the case of Gain, a slight correlation can be seen in the case of D1, D4, and D6. The sensitivity chart shows that the minimum and maximum points for Range increased slightly in the case of ±1.0V. However, there is a slight decrease in the maximum point of Gain for ±1.0V than ±0.9V. There is not much change in the center point with the supply voltage variation. To verify this fact same analyses were done for different sets of samples. Therefore, it can be concluded that with higher voltage, it is not possible to achieve higher Gain with the variation of Vth, but the output voltage Range can be higher.
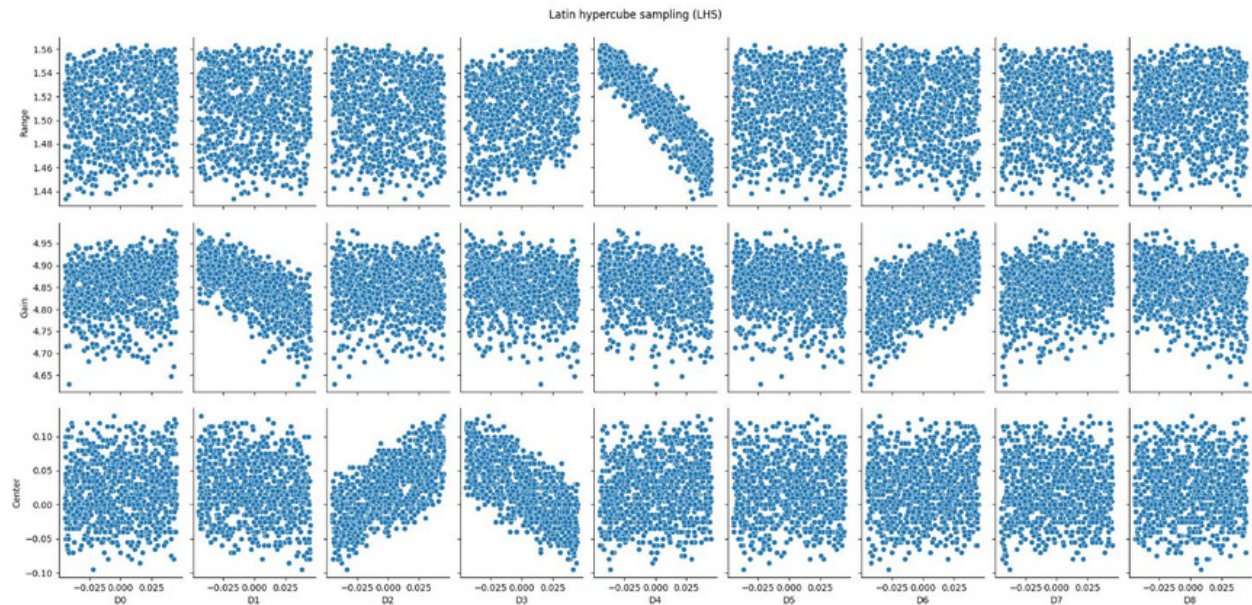
Optional:

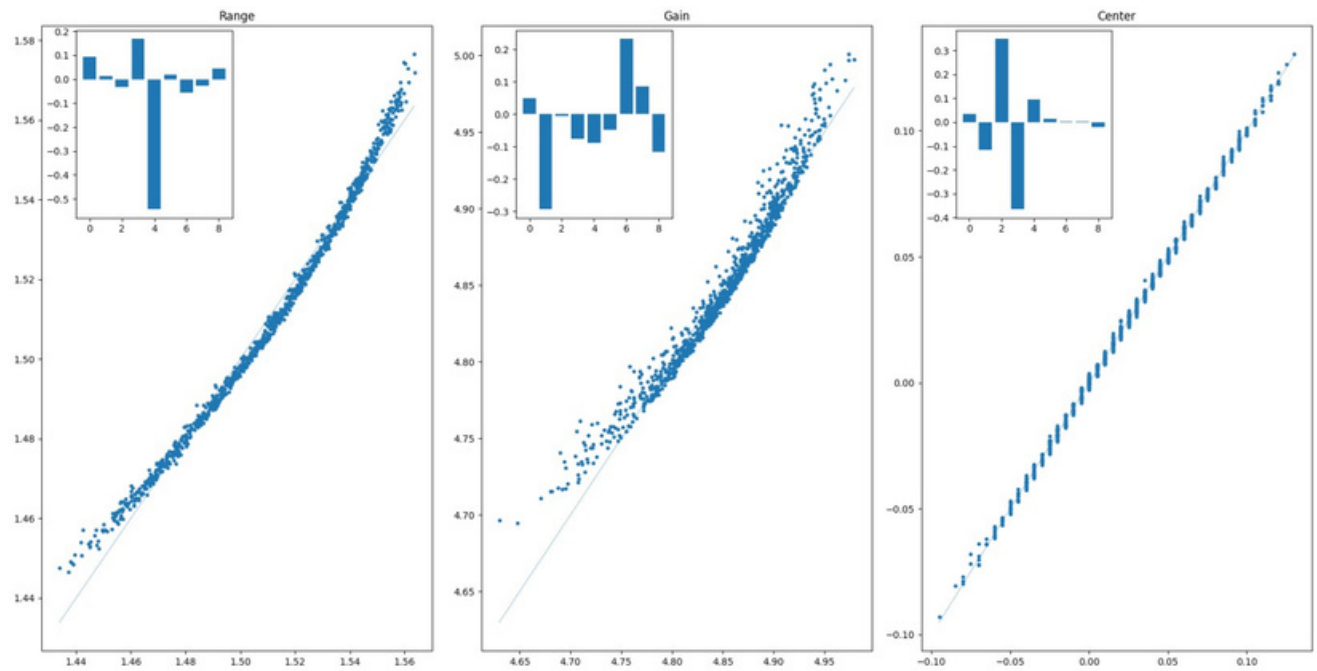Fig. 13. Latin Hypercube sampling of Range, Gain, And Center of size 1000 in the 9 VTH variations.

Fig. 14. Sensitivity of Range, Gain, And Center to a LHS of size 1000 in the 9 VTH variations for power supplies ±0.9V.

Table: Sensitivity for power supplies ±0.9V

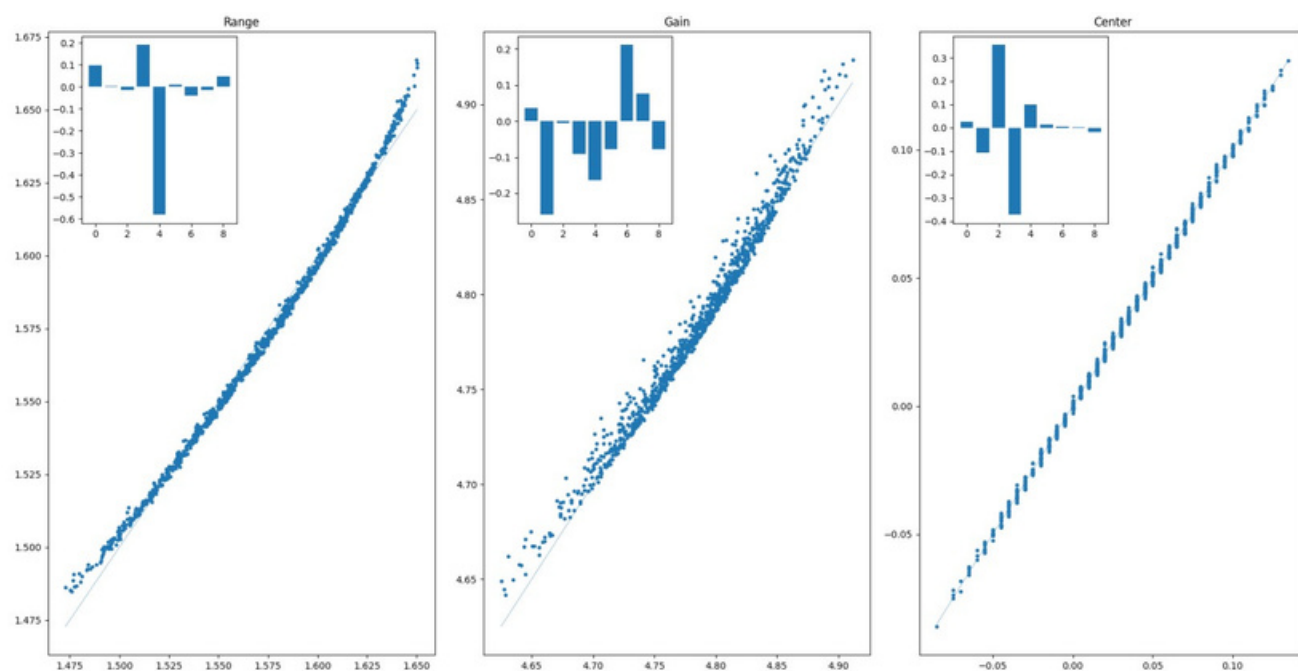|	Parameters	D0	D1	D2	D3	D4	D5	D6	D7	D8
0	Range	0.0947884	0.0135626	-0.0320389	0.167363	-0.54362	0.0195751	-0.0570166	-0.0263599	0.0456756
1	Gain	0.0495597	-0.294441	-0.00626153	-0.076574	-0.0900373	-0.0489269	0.232011	0.0852865	-0.116903
2	Center	0.0337809	-0.115688	0.348412	-0.365524	0.0964685	0.01544	0.00397696	0.00170303	-0.0190068

Fig. 15. Sensitivity of Range, Gain, And Center to a LHS of size 1000 in the 9 VTH variations for power supplies ±1.0V.

Table: Sensitivity for power supplies ±1.0V

	Parameters	D0	D1	D2	D3	D4	D5	D6	D7	D8
0	Range	0.0968145	0.00500609	-0.0161733	0.19036	-0.581347	0.00979823	-0.0384073	-0.0156041	0.0464894
1	Gain	0.0362992	-0.25988	-0.00599476	-0.0904417	-0.163775	-0.0784298	0.211163	0.0765541	-0.0774618
2	Center	0.0249235	-0.10673	0.354841	-0.372436	0.0998319	0.0155973	0.00475961	0.00247861	-0.0184028