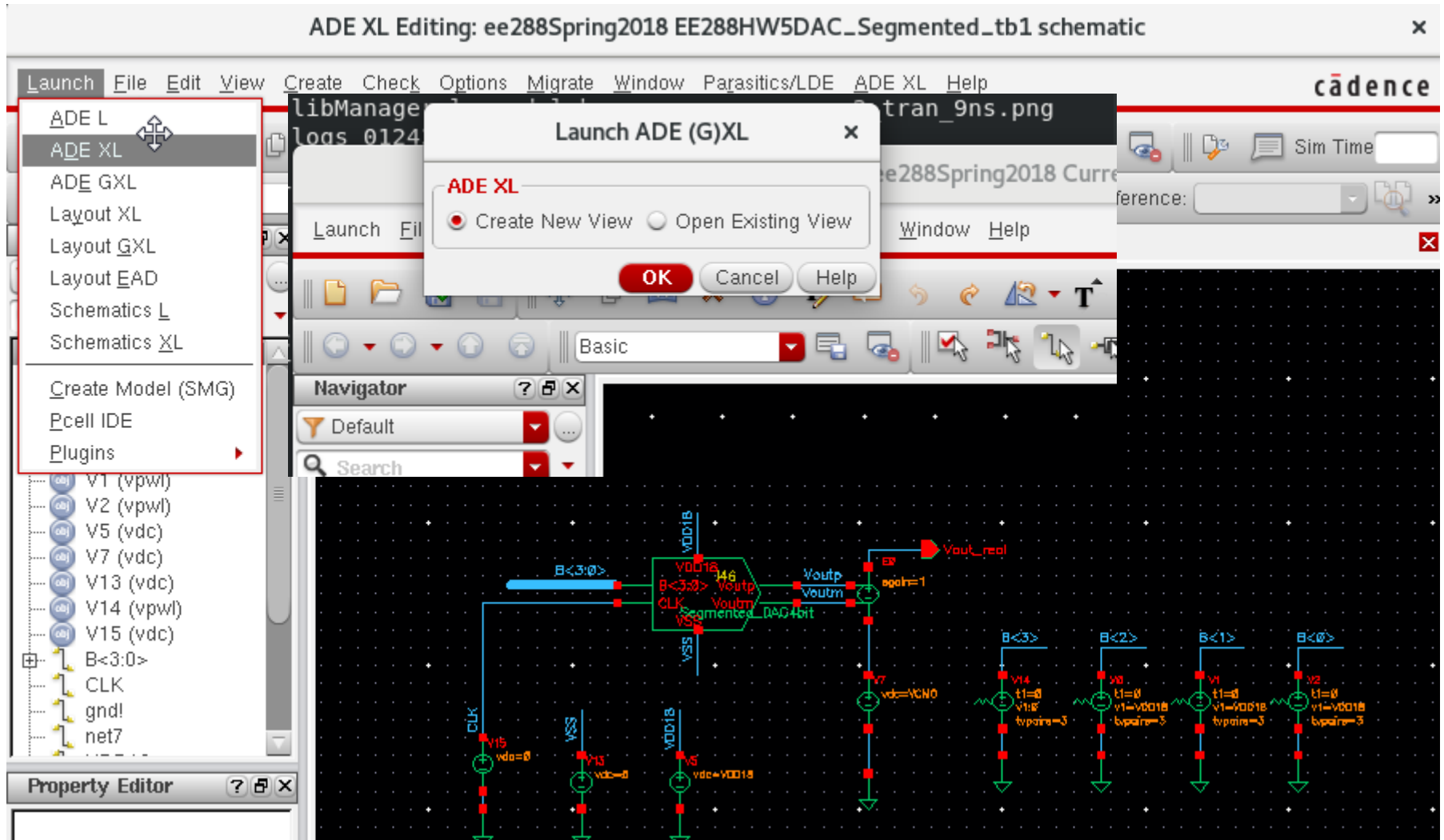
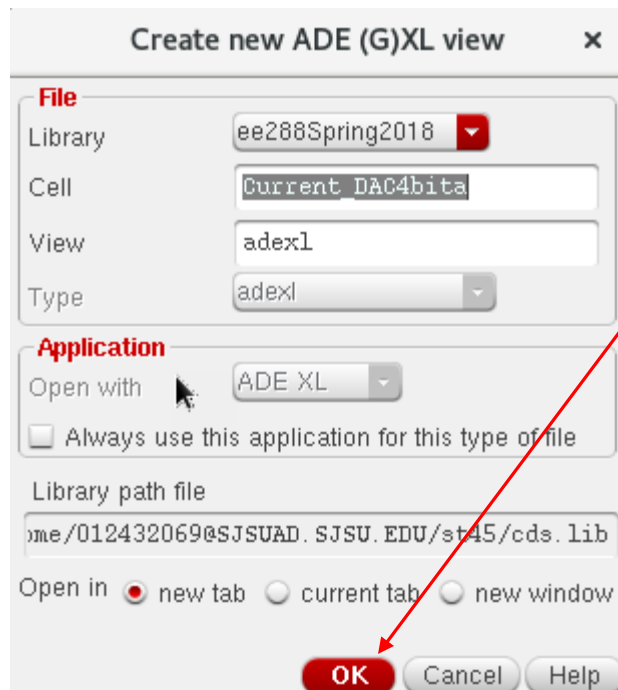


Monte Carlo Simulation Setup

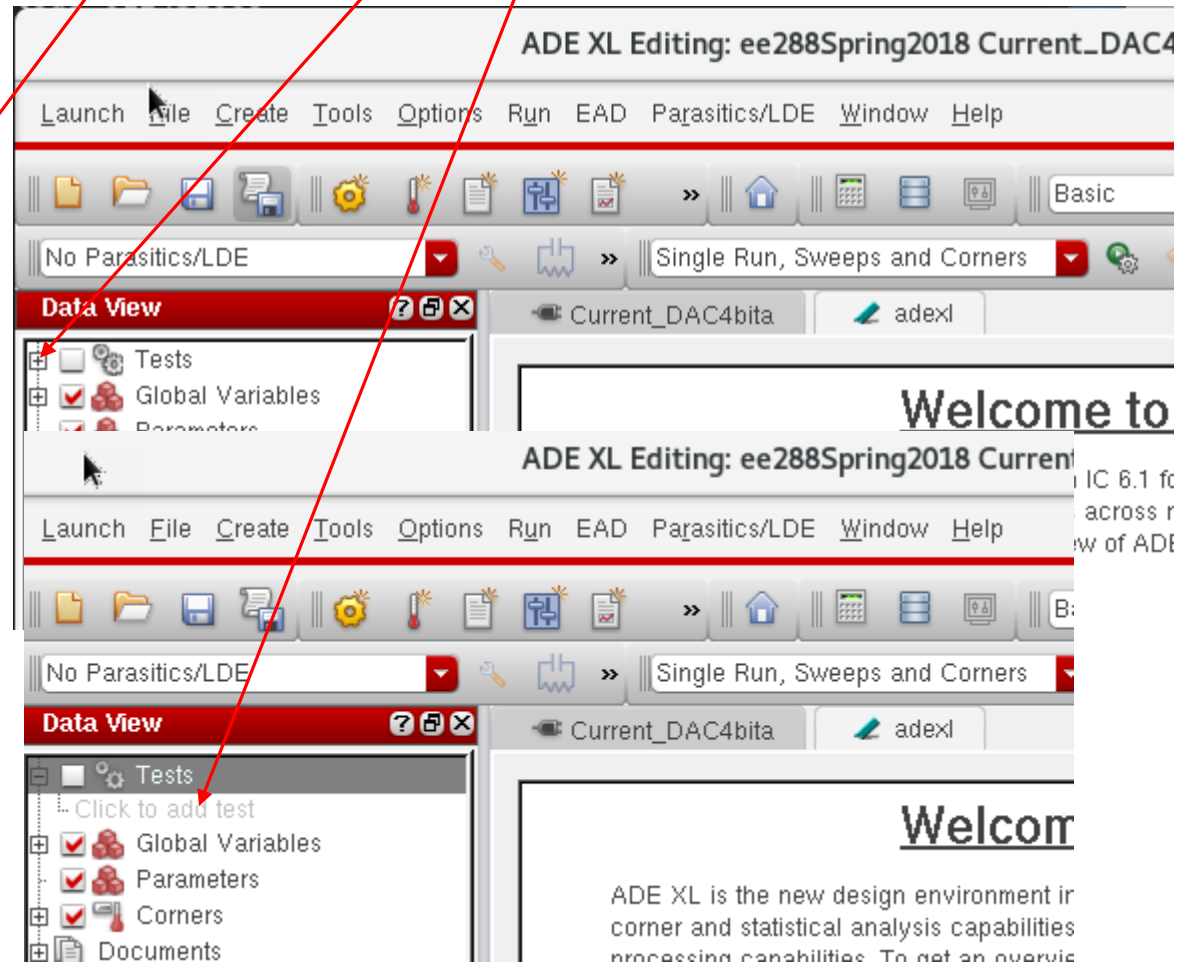
In Schematic View, Launch ADE XL and choose Create New View



Monte Carlo Simulation Setup

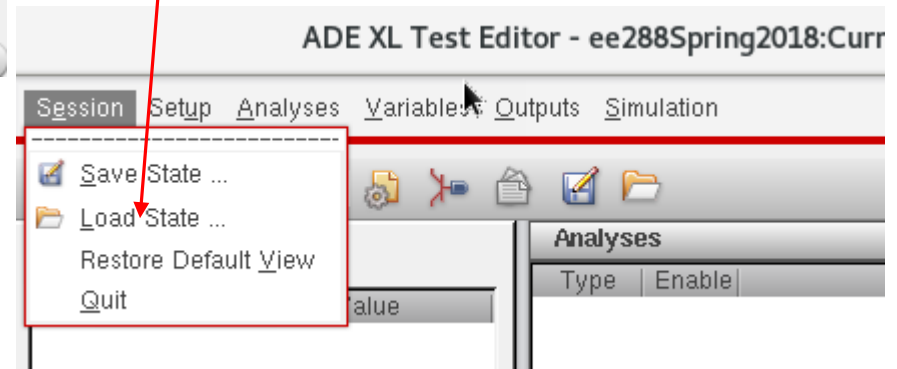
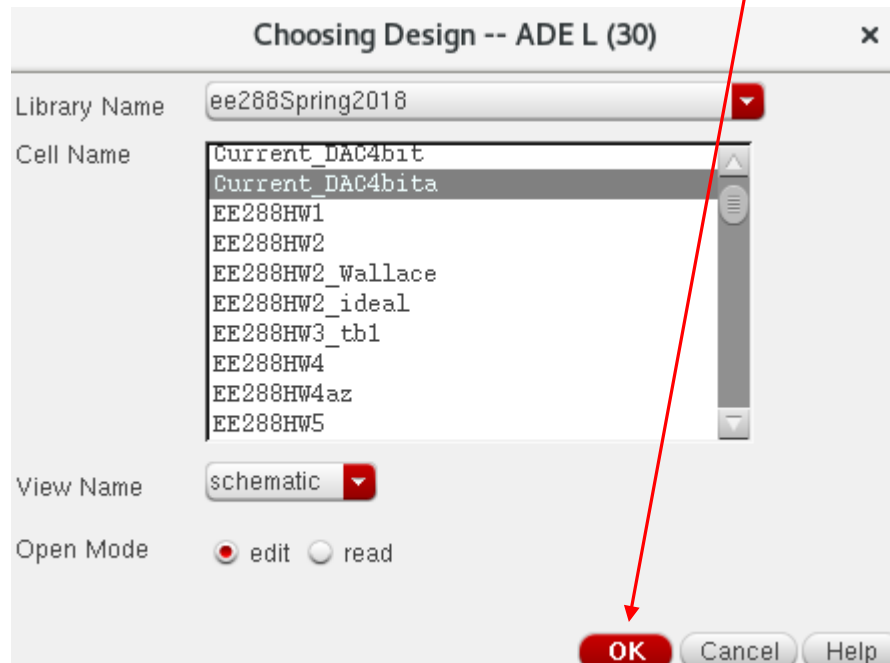


Click OK and then Click to add test



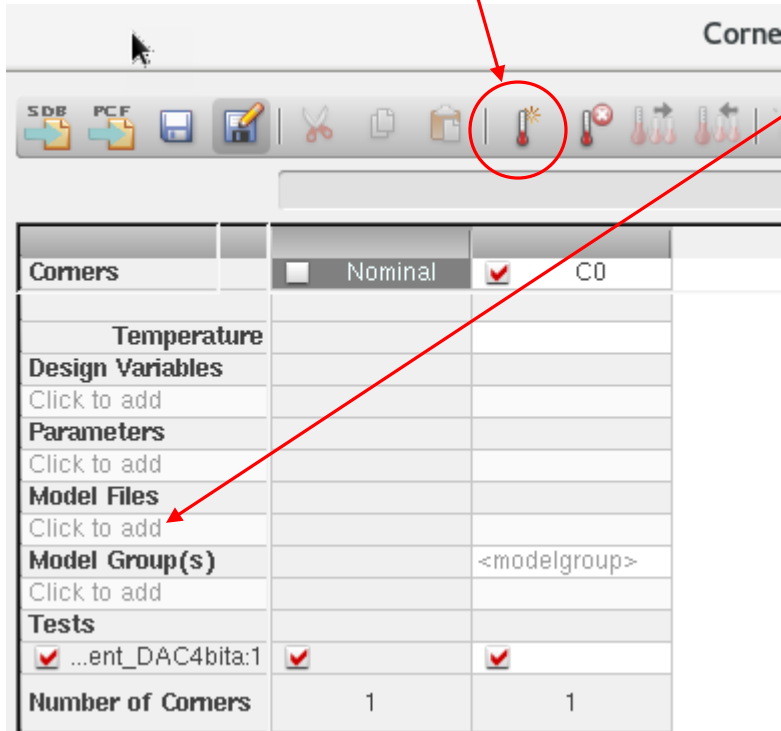
Monte Carlo Simulation Setup

Click OK and then Load State ...

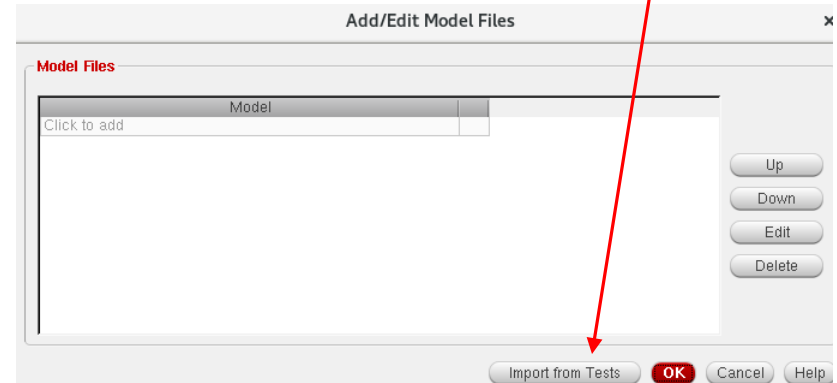


Monte Carlo Simulation Setup

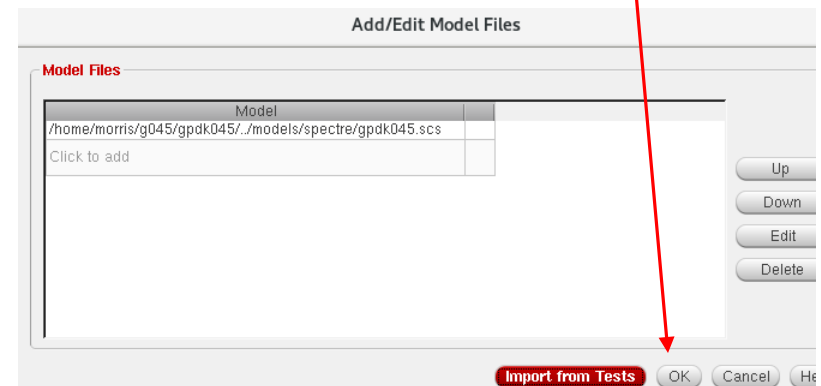
Click on Corner Setup Icon and then click on “Click to add”



Then click on “Import from Tests”

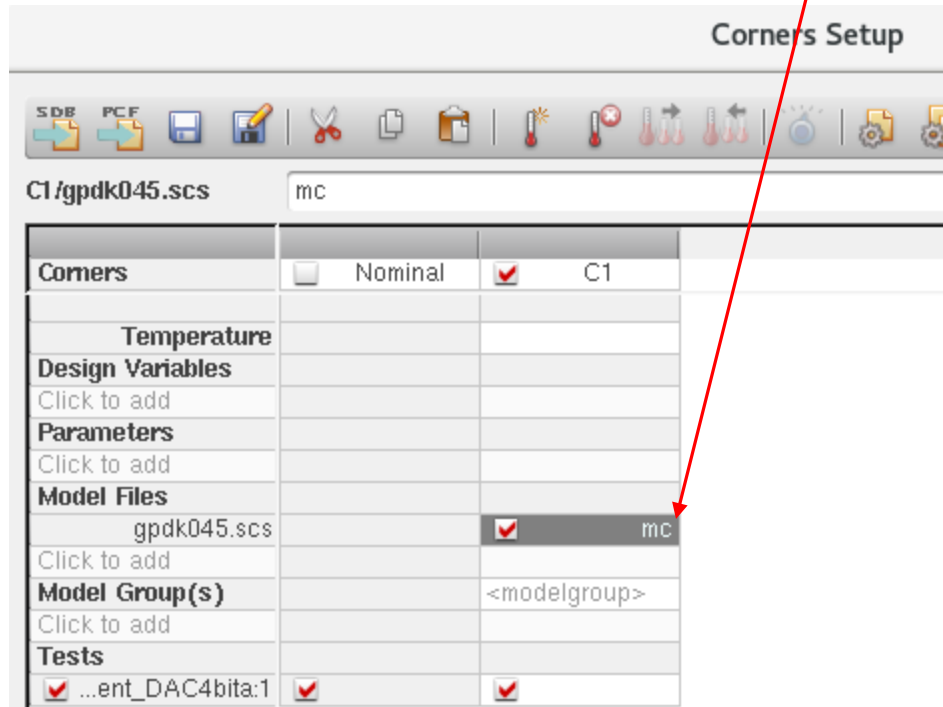


Then click on “OK”



Monte Carlo Simulation Setup

De-select "Normal" and Select C1 and then choose "mc"



Monte Carlo Simulation Setup

Select Monte Carlo Sampling

ADE XL Editing: ee288Spring2018 EE288HW5DAC_Segmented_tb1 adexl

Launch File Create Tools Options Run EAD Parasitics/LDE Window Help

Basic

No Parasitics/LDE

Monte Carlo Sampling

- Single Run, Sweeps and Corners
- Monte Carlo Sampling
- Global Optimization
- Local Optimization
- Improve Yield
- High Yield Estimation
- Sensitivity Analysis
- Feasibility Analysis
- Create Worst Case Corners
- Manual Tuning

Data View

- ☒ Tests
- ☒ Global Variables
- ☒ Parameters
- ☒ Corners
- ☐ Documents
- ☐ Setup States
- ☐ Reliability Analyses

Run Summary

- 1 Test
- ☒ 1 Point Sweep
- ☒ 1 Corner
- ☐ Nominal Corner

Outputs

	Name	Type	Expression/Signal/File
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<3>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<2>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<1>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<0>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Voutp
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Voutm
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Vout_real
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	deltaV	expr	(value(v("Vout_real" ?result
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	V_5n	expr	value(v("Vout_real" ?result "
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	V_15n	expr	value(v("Vout_real" ?result "

Monte Carlo Simulation Setup

Click the Monte Carlo setup icon and fill out the form

The screenshot shows the Monte Carlo Simulation Setup dialog box on the left and the ADE XL Editing window on the right. A red arrow points from the text above to the Monte Carlo Sampling icon in the ADE XL toolbar.

Monte Carlo Setup Dialog Box:

- Statistical Variation:** ☐ Process ☐ Mismatch ☒ All
- Sampling Method:** Random (dropdown)
- Number of Points: 200
- Number of Bins: (empty)
- ☐ Auto Stop Using Significance Test
- Target Yield: 99.73 %
- alpha: 0.05
- Results Database Save Options:**
 - ☒ Save Process Data
 - ☐ Save Mismatch Data
- Other Options:**
 - ☐ Use Reference Point
 - ☒ Run Nominal Simulation
 - ☐ Save Data to Allow Family Plots
 - Monte Carlo Seed: (empty)
 - ☐ Starting Run Number: (empty)
- Specify Instances/Devices (Not Specified)
- Buttons: OK, Cancel, Help

ADE XL Editing Window:

- Title: ADE XL Editing: ee288Spring2018_EE288HW5DAC_Segmented_tb1 adexl
- Menu: Options, Run, EAD, Parasitics/LDE, Window, Help
- Toolbar: Basic (dropdown), Monte Carlo Sampling (icon), Reference: (dropdown)
- Tab: EE288HW5DAC_Segmented_tb1
- Buttons: Outputs Setup, Results, Diagnostics
- Table:

Test	Name	Type	Expres
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<3>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<2>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<1>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<0>
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Voutp
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Voutm
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Vout_real
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	deltaV	expr	(value(v("V
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	V_5n	expr	value(v("V
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	V_15n	expr	value(v("V

Monte Carlo Simulation Setup

Setup the result expression to calculate the DNL at major bit transition as shown below.

ADE XL Editing: ee288Spring2018 EE288HW5DAC_Segmented_tb1 adexl

File Edit View Windows Help

Basic

Monte Carlo Sampling


EE288HW5DAC_Segmented_tb1 adexl

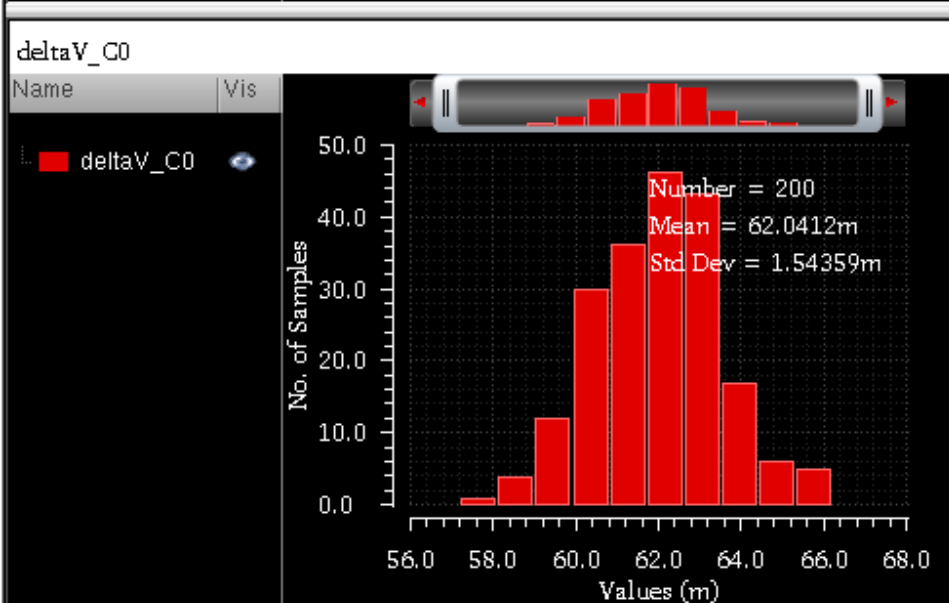
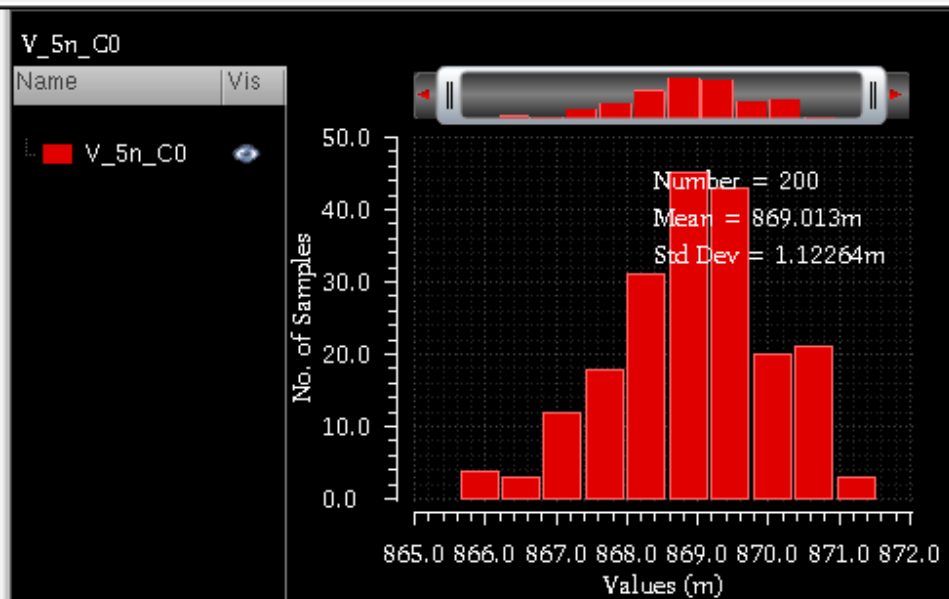
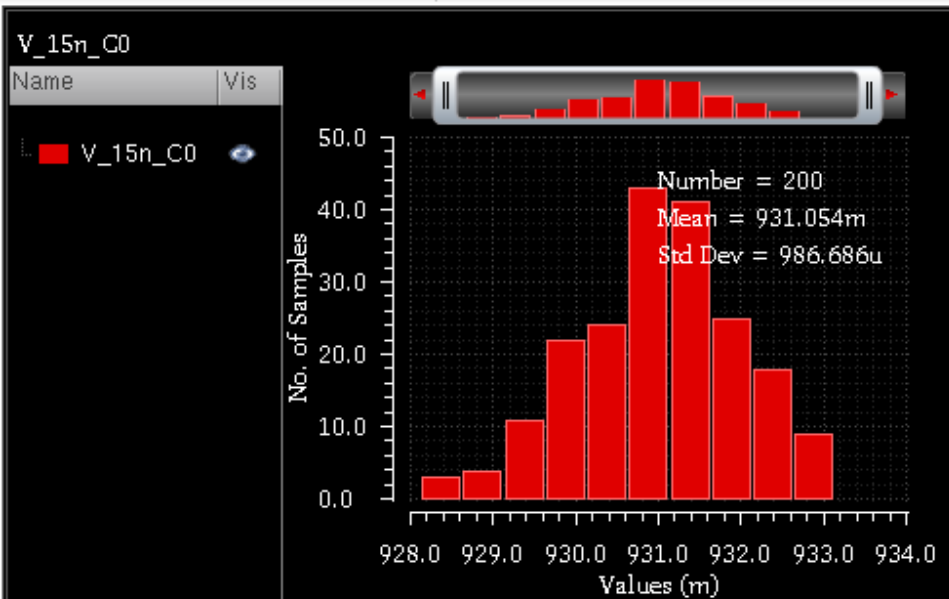
Outputs Setup Results Diagnostics

Test	Name	Type	Expression/Signal/File	Eval
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<3>	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<2>	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<1>	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/B<0>	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Voutp	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Voutm	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1		signal	/Vout_real	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	deltaV	expr	(value(v("Vout_real" ?result "tran") 1.5e-08) - value(v("Vout_real" ?result "tran") 5e-09))	
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	V_5n	expr	value(v("Vout_real" ?result "tran") 5e-09)	Vout at Code 0111
ee288Spring2018:EE288HW5DAC_Segmented_tb1:1	V_15n	expr	value(v("Vout_real" ?result "tran") 1.5e-08)	Vout at Code 1000

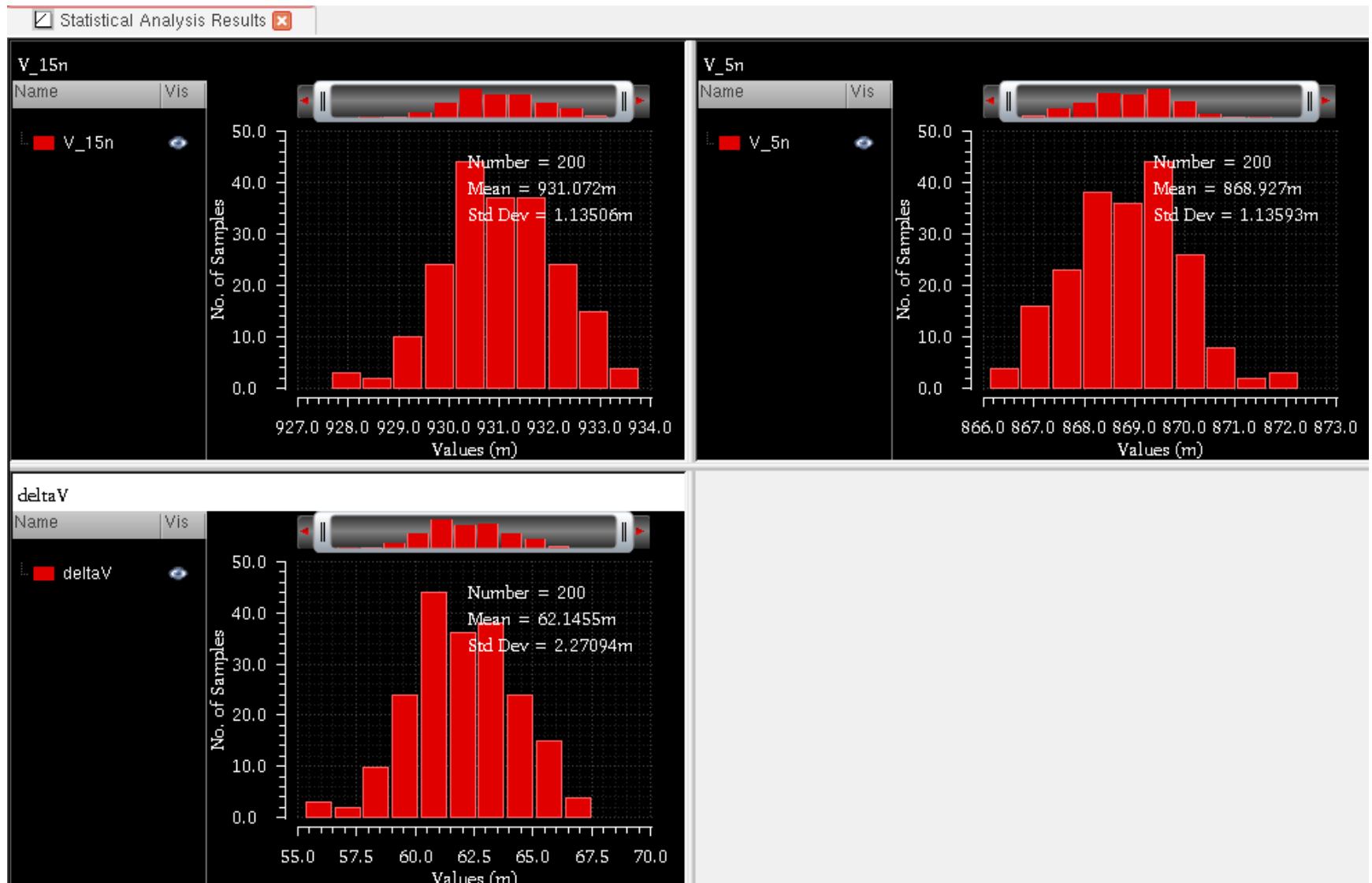
$$\text{deltaV} = \text{DNL} = \text{Vout at Code 1000} - \text{Vout at Code 0111}$$

MC Simulation Result: Segmented DAC

☒ Statistical Analysis Results 



MC Simulation Result: Binary Weighted DAC



DAC Monte Carlo Simulation

Segmented vs Binary Weighted

