Spice Interface

Release 0.2

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CHAPTER

ONE

SPICE_INVOKER MODULE

class spice_invoker.**LTSpiceInvoker**(*library='CMOS18TT.lib'*, *modelname='C18nmos'*, *lib_corner=''*, *save_plots=0*)

Bases: object

LT Spice invoker class, contains several functions to interface with LTSpice

Cd_r_Plot(*Id='1u'*, *VDSmin='0.2'*, *VDSmax='2'*, *VDSstep='0.05'*, *Freq='10Meg'*)

Create a reverse Drain capacitance plot, the transistor size is set using setSize().

Parameters

- **Id** (*string*) – Value at which the ft sweep is started, string should be formatted such that it can be interpreted by LTSpice
- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency at which to simulate the capacitance, string should be formatted such that it can be interpreted by LTSpice

Cg_fw_Plot(*Id='1u'*, *VDSmin='0.2'*, *VDSmax='2'*, *VDSstep='0.05'*, *Freq='10Meg'*)

Create a forward Gate capacitance plot, the transistor size is set using setSize().

Parameters

- **Id** (*string*) – Value at which the ft sweep is started, string should be formatted such that it can be interpreted by LTSpice
- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency at which to simulate the capacitance, string should be formatted such that it can be interpreted by LTSpice

Cgd_fw_Plot(*Id='1u'*, *VDSmin='0.2'*, *VDSmax='2'*, *VDSstep='0.05'*, *Freq='10Meg'*)

Create a forward Gate-Drain capacitance plot, the transistor size is set using setSize().

Parameters

- **Id** (*string*) – Value at which the ft sweep is started, string should be formatted such that it can be interpreted by LTSpice
- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency at which to simulate the capacitance, string should be formatted such that it can be interpreted by LTSpice

Cgd_r_Plot(*Id='1u'*, *VDSmin='0.2'*, *VDSmax='2'*, *VDSstep='0.05'*, *Freq='10Meg'*)

Create a reverse Gate-Drain capacitance plot, the transistor size is set using setSize().

Parameters

- **Id** (*string*) – Value of the current throught the transistor string should be formatted such that it can be interpreted by LTSpice
- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency at which to simulate the capacitance string should be formatted such that it can be interpreted by LTSpice

Ft_Id_Plot(*Imin='1n'*, *Imax='100u'*, *VDSmin='0.2'*, *VDSmax='1.8'*, *VDSstep='0.4'*)

Create a Ft Id plot while stepping over Vds, the transistor size is set using setSize()

Parameters

- **Imin** (*string*) – Value at which the ft sweep is started, string should be formatted such that it can be interpreted by LTSpice
- **Imax** (*string*) – Value at which the ft sweep is stopped, string should be formatted such that it can be interpreted by LTSpice
- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice

Ft_Id_Plot_w(*Imin='1n'*, *Imax='100u'*, *VDS='1'*, *Wmin='200n'*, *Wmax='1u'*, *Wstep='200n'*)

Create a Ft Id plot while stepping over the transistor width, The the transistor length is set using setSize(), the width is given as a parameter in this function.

Parameters

- **Imin** (*string*) – Value at which the ft sweep is started, string should be formatted such that it can be interpreted by LTSpice

- **Imax** (*string*) – Value at which the ft sweep is stopped, string should be formatted such that it can be interpreted by LTSpice
- **VDS** (*string*) – Value of VDS, string should be formatted such that it can be interpreted by LTSpice
- **Wmin** (*string*) – Value from which to start stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wmax** (*string*) – Value to stop stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wstep** (*string*) – Stepping value to increment from Wmin to Wmax, string should be formatted such that it can be interpreted by LTSpice

Gm_Id_Plot(*VDSmin='0.3'*, *VDSmax='1.8'*, *VDSstep='0.3'*, *VGSmax='1.8'*)

Create a Gm Id plot while stepping over VDS, the transistor size is set using setSize()

Parameters

- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice
- **VGSmax** (*string*) – Maximum value for VGS, string should be formatted such that it can be interpreted by LTSpice

Gm_Id_Plot_w(*Wmin='200n'*, *Wmax='1u'*, *Wstep='200n'*, *VGSmax='1.8'*, *VDS='1'*)

Create a Gm Id plot while stepping the transitor width. The the transistor length is set using setSize(), the width is given as a parameter in this function.

Parameters

- **Wmin** (*string*) – Value from which to start stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wmax** (*string*) – Value to stop stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wstep** (*string*) – Stepping value to increment from Wmin to Wmax, string should be formatted such that it can be interpreted by LTSpice
- **VGSmax** (*string*) – Maximum value for VGS, string should be formatted such that it can be interpreted by LTSpice
- **VDS** (*string*) – Value for VDS, string should be formatted such that it can be interpreted by LTSpice

Id_Vds_Plot(*VGSmin='0'*, *VGSmax='2'*, *VGSstep='0.4'*, *VDSmax='2'*)

Create a Id Vds plot while stepping over VGS, the transistor size is set using setSize()

Parameters

- **VGSmin** (*string*) – Value from which to start stepping VGS, string should be formatted such that it can be interpreted by LTSpice
- **VGSmax** (*string*) – Value to stop stepping VGS, string should be formatted such that it can be interpreted by LTSpice

- **VGSstep** (*string*) – Stepping value to increment from VGSmin to VGSmax, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Maximum value for VDS, string should be formatted such that it can be interpreted by LTSpice

Id_Vds_Plot_w(*Wmin='200n'*, *Wmax='1u'*, *Wstep='200n'*, *VDSmax='2'*, *VGS='2'*)

Create a Id Vds plot while stepping the transitor width. The the transistor length is set using setSize(), the width is given as a parameter in this function.

Parameters

- **Wmin** (*string*) – Value from which to start stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wmax** (*string*) – Value to stop stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wstep** (*string*) – Stepping value to increment from Wmin to Wmax, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Maximum value for VDS, string should be formatted such that it can be interpreted by LTSpice
- **VGS** (*string*) – Value for VGS, string should be formatted such that it can be interpreted by LTSpice

Id_Vgs_Plot(*VDSmin='0'*, *VDSmax='2'*, *VDSstep='0.4'*, *VGSmax='2'*)

Create a Id Vgs plot while stepping over VDS, the transistor size is set using setSize()

Parameters

- **VDSmin** (*string*) – Value from which to start stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSmax** (*string*) – Value to stop stepping VDS, string should be formatted such that it can be interpreted by LTSpice
- **VDSstep** (*string*) – Stepping value to increment from VDSmin to VDSmax, string should be formatted such that it can be interpreted by LTSpice
- **VGSmax** (*string*) – Maximum value for VGS, string should be formatted such that it can be interpreted by LTSpice

Id_Vgs_Plot_w(*Wmin='200n'*, *Wmax='1u'*, *Wstep='200n'*, *VGSmax='2'*, *VDS='2'*)

Create a Id Vgs plot while stepping the transitor width. The the transistor length is set using setSize(), the width is given as a parameter in this function.

Parameters

- **Wmin** (*string*) – Value from which to start stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wmax** (*string*) – Value to stop stepping the transitor width, string should be formatted such that it can be interpreted by LTSpice
- **Wstep** (*string*) – Stepping value to increment from Wmin to Wmax, string should be formatted such that it can be interpreted by LTSpice
- **VGSmax** (*string*) – Maximum value for VGS, string should be formatted such that it can be interpreted by LTSpice
- **VDS** (*string*) – Value for VDS, string should be formatted such that it can be interpreted by LTSpice

Nf_Freq_Plot (*Imin='10n'*, *Imax='10u'*, *Rin='1k'*, *Freq='1G'*)
Create a NF frequency plot while stepping over the current *I*, the transistor size is set using setSize()

Parameters

- **Imin** (*string*) – Value from which to start stepping I, string should be formatted such that it can be interpreted by LTSpice
- **Imax** (*string*) – Value to stop stepping I, string should be formatted such that it can be interpreted by LTSpice
- **Rin** (*string*) – Input resistance value for the netlist, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency value up to which to simulate, string should be formatted such that it can be interpreted by LTSpice

Nf_Freq_Plot_r (*Id='1u'*, *Rmin='1'*, *Rmax='1k'*, *Freq='1G'*)
Create a NF frequency plot while stepping over the input resistor *R*, the transistor size is set using setSize()

Parameters

- **Id** (*string*) – Value for the transistor current Id, string should be formatted such that it can be interpreted by LTSpice
- **Rmin** (*string*) – Value to start stepping the input resistance R, one resistance value will be taken per decade, string should be formatted such that it can be interpreted by LTSpice
- **Rmax** (*string*) – Value at which to stop stepping input resistance R, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency value up to which to simulate, string should be formatted such that it can be interpreted by LTSpice

Nf_Freq_Plot_w (*Id='1u'*, *Rin='1k'*, *Wmin='200n'*, *Wmax='1u'*, *Wstep='200n'*, *Freq='1G'*)
Create a NF frequency plot while stepping over the transistor width *W* the transistor length is set using setSize()

Parameters

- **Id** (*string*) – Value for the transistor current Id, string should be formatted such that it can be interpreted by LTSpice
- **Rin** (*string*) – Value of the input resistance R, one resistance value will be taken per decade, string should be formatted such that it can be interpreted by LTSpice
- **Wmin** (*string*) – Value at which to start stepping the transistor width W, string should be formatted such that it can be interpreted by LTSpice
- **Wmax** (*string*) – Value at which to stop stepping the transistor width W, string should be formatted such that it can be interpreted by LTSpice
- **Wstep** (*string*) – Stepping value to increment from Wmin to Wmax, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency value up to which to simulate, string should be formatted such that it can be interpreted by LTSpice

Nf_Freq_Plot_wi (*Id='1u'*, *Rin='1k'*, *Wmin='200n'*, *Wmax='1u'*, *Wstep='200n'*, *Freq='1G'*)
Create a NF frequency plot while altering both *W* and *I*, the transistor length is set using setSize()

Parameters

- **Id** (*string*) – Value for the transistor current Id, string should be formatted such that it can be interpreted by LTSpice

- **Rin** (*string*) – Value of the input resistance R, one resistance value will be taken per decade, string should be formatted such that it can be interpreted by LTSpice
- **Wmin** (*string*) – Value at which to start stepping the transistor width W, string should be formatted such that it can be interpreted by LTSpice
- **Wmax** (*string*) – Value at which to stop stepping the transistor width W, string should be formatted such that it can be interpreted by LTSpice
- **Wstep** (*string*) – Stepping value to increment from Wmin to Wmax, string should be formatted such that it can be interpreted by LTSpice
- **Freq** (*string*) – Frequency value up to which to simulate, string should be formatted such that it can be interpreted by LTSpice

clean()

Clean up the tmp folders created during initializeLib and initializeCir with the created/copied files

setSize(*W='200n'*, *L='200n'*)

Set the size of the transistor with which plots are generated

Parameters

- **W** (*string*) – Width of the transistor, set string to something **which can be interpreted by LTSpice** (f.e. 200n, 1 u or 1e-6)
- **L** (*string*) – Length of the transistor, set string to something **which can be interpreted by LTSpice** (f.e. 200n, 1 u or 1e-6)

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