

HyperLynx Touchstone Viewer Automation

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Rev 1.0

Application

Object representing HyperLynx application.

Set App = Application

Properties

GUI – Object representing application GUI. Read-only. (See also [GUI](#)).

Set GUI = Application.GUI

Viewer – Object representing chart viewer. Read-only. (See also [Viewer](#)).

Set Viewer = Application.Viewer

Converter – Object representing Touchstone model converter. Read-only. (See also [Converter](#)).

Set Converter = Application.Converter

Methods

OpenFile FileName – Opens specified file of any supported type.

Returns Model object in case of success, null object otherwise. (See also [Model](#)).

Set Model = Application.OpenFile("C:\mentorgraphics\9.2HL\SDD_HOME\hyperlynx64\Libs\example.s4p")

CloseModel Model – Closes specified model.

Application.CloseModel Model

GetModelCount – Returns number of currently opened models.

nCount = Application.GetModelCount()

GetModel Index – Returns model specified by 1-based index.

Set Model = Application.GetModel(1)

Converter

Object representing Touchstone model converter.

Methods

ForcePassivity Model, sNewFile – Forces model passivity for specified model.

Saves new model using specified name, opens the model in the viewer, returns opened model.

Set NewModel = Converter.ForcePassivity(Model, "example_passive.s4p")

ForceSymmetry Model, sNewFile - Forces model symmetry for specified model.

Saves new model using specified name, opens the model in the viewer, returns opened model.

Cannot be applied to fitted models.

Set NewModel = Converter.ForcePassivity(Model, "example_symmetric.s4p")

Renormalize Model, sNewFile, R - Renormalizes specified model using specified reference resistance for single-ended mode.

Saves new model using specified name, opens the model in the viewer, returns opened model.

Cannot be applied to fitted models.

Set NewModel = Converter.Renormalize(Model, "example_75ohm.s4p", 75)

ConvertParamType Model, sNewFile, paramType – Converts model to specified parameter type (e.g. S to Y etc.).

Saves new model using specified name, opens the model in the viewer, returns opened model.

Cannot be applied to fitted models.

Possible parameter types are:

tvParamTypeS – Scattering matrix

tvParamTypeY – Admittance matrix

tvParamTypeZ – Impedance matrix

Set NewModel = Converter.ConvertParamType(Model, "example_75ohm.z4p", tvParamTypeZ)

ConvertMode Model, sNewFile, convType, dpp - Converts model using specified conversion type (e.g. standard to mixed etc.) and differential ports map.

Saves new model using specified name, opens the model in the viewer, returns opened model.

Can be applied only to S-parameter 4-port model.

Possible conversion types are:

tvConvMixedToStd - convert mixed-mode to standard mode model

tvConvStdToMixed - convert standard mode to mixed-mode model

tvConvMixedToDiff - convert mixed-mode to differential mode model

Possible differential port maps are:

tvDiffPair_12_34 - positive channel ports are 1 and 2, negative ones are 3 and 4

tvDiffPair_13_24 - positive channel ports are 1 and 3, negative ones are 2 and 4

Set NewModel = Converter.ConvertMode(Model, "example.s2p", tvConvMixedToDiff, tvDiffPair_12_34)

CreateDiffPairMap Model – Creates and returns DiffPairMap object for specified model size. (See also [DiffPairMap](#)).

Set DPM = Converter.CreateDiffPairMap(Model)

ConvertStdToMixed Model, sNewFile, pMap – Converts standard mode model to mixed mode model using specified differential channels map (see also [DiffPairMap](#)).

Saves new model using specified name, opens the model in the viewer, returns opened model.

Can be applied only to S-parameter model with number of ports multiple of four.

Set Model = Converter.ConvertStdToMixed(Model, "mixed_mode.s8p", DPM)

CreatePortLoads Model – Creates and returns PortLoads object for specified model size. (See also [PortLoads](#)).

Set Loads = Converter.CreatePortLoads(Model)

ReducePorts Model, sNewFile, Loads – Reduces number of model ports using specified port loads (see also [PortLoads](#)).

Saves new model using specified name, opens the model in the viewer, returns opened model.

May be applied only to non-fitted S-parameter models.

Set NewModel = Converter.ReducePorts(Model, "example.s3p", Loads)

ConvertToTransferFunction Model, sNewFile, Dpp, [Z1 = 50], [Z2 = 50], [Y1 = 0.02], [Y2 = 0.02], [Y12 = 0] – Converts differential model to transfer function using specified differential ports map Dpp.

Saves transfer function as S1P model using specified sNewFile name, opens the model in the viewer, return opened model.

May be applied to 4-port non-fitted models.

Set TF = Converter.ConvertToTransferFunction(Model, "TF.s1p", tvDiffPair_13_24)

DiffPairMap

Object representing differential pair ports for each differential channel in a model.

Properties

Count – Number of differential channels in a model. Read-only.

Methods

SetDiffPair nIndex, InpPos, OutPos, InpNeg, nOutNeg – Sets input positive, output positive, input negative and output negative ports for specified differential channel. Ports are specified by 1-based port numbers, channel is specified by 1-based channel index.

DPM.SetDiffPair 1, 1, 2, 3, 4

GetDiffPair nIndex, InpPos, OutPos, InpNeg, OutNeg – Returns currently set input positive, output positive, input negative and output negative ports for specified differential channel. If the channel is not set, port numbers are equal to zero.

DPM.GetDiffPair 1, InpPos, OutPos, InpNeg, OutNeg

SetByPattern InpPos, OutPos, InpNeg, OutNeg – Sets input positive, output positive, input negative and output negative ports for all differential channels using specified ports as pattern. Pattern ports must be specified for the first channel (i.e. one of port numbers should be equal to 1).

DPM.SetByPattern 1, 2, 5, 6

GUI

Object representing application GUI.

Properties

PlotType – Currently active plot type. Possible values are:

tvPlotTypeReal – display real part

tvPlotTypeImag – display imaginary part

tvPlotTypeReallmag – display both real and imaginary parts

tvPlotTypeMag – display magnitude

tvPlotTypeMagDB – display magnitude in dB

tvPlotTypeAngle – display angle

tvPlotTypeMagAngle – display both magnitude and angle

tvPlotTypePolar – display polar plot

tvPlotTypePassive – display passivity curve

tvPlotTypeTDResponse – display time-domain response

tvPlotTypeTDImpedance – display TDR impedance

tvPlotTypeChannelMetrics – display protocol-specific metrics

GUI.PlotType = tvPlotTypeMag

TDCtrl – Object controlling Time-Domain charts generation. (See also [TDCtrl](#))

Set TDCtrl = GUI.TDCtrl

Methods

Enable Model, Enable – Enables or disables specified model.

GUI.Enable Model, True

IsEnabled Model – Returns True if the models is enabled or False otherwise.

If GUI.IsEnabled(Model) Then

Select Model, Select – Selects or deselects specified model.

GUI.Select Model, True

SelectAll Select – Selected or deselects all opened models.

GUI.SelectAll True

IsSelected Model – Returns True if the model is selected, False otherwise.

If GUI.IsSelected(Model) Then

Check Row, Col, Check – Checks or unchecks matrix element specified by 1-based indices Row and Col for all selected models.

GUI.Check 2, 2, True

CheckAll Check – Checks or unchecks all matrix elements for all selected models.

GUI.CheckAll True

IsChecked Row, Col – Returns True if the matrix element is checked for all selected models, False otherwise

If GUI.IsChecked(2, 2) Then

GetColor Model, nRow, nCol, [PlotType = 0] – Returns color of the chart specified by Model, 1-based matrix element indexes and plot type. Optional parameter PlotType allows to specify particular curve by plot type if current GUI.PlotType requires more than one chart per single matrix element (e.g. tvPlotTypeMagAngle).

Clr = GUI.GetColor(Model, 1, 1, tvPlotTypeAngle)

SetColor Color, Model, Row, Col, [PlotType = 0] – Sets color of the specified chart (see GetColor for parameters description).

GUI.SetColor RGB(0, 255, 255), Model, 2, 2, tvPlotTypeAngle

Model

Object representing Touchstone model.

Properties

FileName – Model file name. Read-only.

Name = Model.FileName

IsFitted – True is the model is fitted (i.e. is PLS model), False otherwise. Read-only.

If Model.IsFitted Then

ParamType – Model parameter type. Read-only. Possible values are:

tvParamTypeS – Scattering matrix model

tvParamTypeY – Admittance matrix model

tvParamTypeZ – Impedance matrix model

If Model.ParamType = tvParamTypeS Then

Dimension – Matrix dimension. Read-only.

If Model.Dimension = 4 Then

PortLoads

Object representing loads connected to model ports for port number reducing.

Properties

Count – Number of loads. Read-only.

For I = 1 To Loads.Count

Methods

GetLoad Index – Returns load type for the specified port.

Possible load types are:

tvPortGrounded – port is connected to ground

tvPortTerminated – port is terminated

tvPortOpened – port is not connected

tvPortDefault – port remains model port

If Load.GetPort(1) = tvPortDefault Then

SetLoad Index, LoadType – Sets load type for the specified port.

Load.SetPort 2, tvPortTerminated

TDCtrl

Object controlling Time-Domain charts generation.

Properties

ImpulseType – Type of input impulse for Time-Domain Response charts. Possible values are:

tvImpTypeDirac – Dirac delta uncton

tvImpTypeUnitStep – unit step (Heaviside function)

tvImpTypeRectangle – rectangular impulse

tvImpTypeTrapezium – trapezoidal impulse

TDCtrl.ImpulseType = tvImpUnitStep

PulseTime – impulse width, ns. Meaningful for Time-Domain response chart, tvImpTypeRectangle and tvImpTypeTrapezium impulse types.

TDCtrl.PulseTime = 4

RiseTime – length of impulse rising edge, ns. Meaningful for Time-Domain response chart, tvImpTypeTrapezium impulse type, and Time-Domain Impedance charts.

TDCtrl.RiseTime = 0.5

FallTime – length of impulse falling edge, ns. Meaningful for Time-Domain response chart, tvImpTypeTrapezium impulse type.

TDCtrl.FallTime = 0.5

StopTime – overall length of Time-Domain chart, ns.

TDCtrl.StopTime = 10

TDType – Type of Time-Domain Impedance chart. Possible values are:

tvTDTypeSingleEnded – calculate impedance for single port

tvTDTypeMixedMode – calculate impedance for pair of ports

TDCtrl.TDType = tvTDTypeMixedMode

Port1 – 1-based index of a port for which Time-Domain Impedance is calculated.

TDCtrl.Port1 = 1

Port2 – 1-based index of a second port for whivh Time-Domain Impedance is calculated. Meaningful if TDType is tvTDTypeMixedMode.

TDCtrl.Port2 = 3

TDIMode – Input model mode, Possible values are:

tvTDIModeCommon – common mode model

tvTDIModeDiff – differential mode model

Meaningful if TDType is tvTDTypeMixedMode.

TDCtrl.TDIMode = tvTDTypeMixedMode

LoadType – termination type for ports other than Port1 (and Port2 if TDType is tvTDTypeMixedMode). Possible values are:

tvPortGrounded – port is connected to ground

tvPortTerminated – port is terminated

tvPortOpened – port is non-connected

TDCtrl.LoadType = tvPortTerminated

Methods

Apply – applies specified parameters to all selected models and recalculate charts if current operation mode is Time-Domain (i.e. GUI.PlotType is tvPlotTypeTDResponse or tvPlotTypeTDImpedance).

Returns True in case of success, False otherwise.

If TDCtrl.Apply = True Then

Viewer

Object representing Chart Viewer.

Methods

GetExtent MinX, MinY, MaxX, MaxY – Returns minimum and maximum coordinates for all currently displayed charts.

Viewer.GetExtent MinX, MinY, MaxX, MaxY

GetZoom MinX, MinY, MaxX, MaxY – Returns current Zoom rectangle.

Viewer.GetZoom MinX, MinY, MaxX, MaxY

SetZoom MinX, MinY, MaxX, MaxY – Sets Zoom rectangle.

Viewer.SetZoom 5e8, -40, 1e9, 0

FitToWindow – Sets Zoom rectangle to make all displayed charts to be completely visible.

Viewer.FitToWindow

GetLogScale Dir – Returns True if logarithmic scale is used for specified axis direction, False otherwise.

Possible axis directions are:

tvDirHorz – horizontal direction

tvDirVert – vertical direction

If Viewer.GetLogScale(tvDirHorz) Then

CanLogScale Dir – Returns True if logarithmic scale can be applied to specified axis direction, False otherwise.

If Viewer.CanLogScale(tvDirHorz) Then

SetLogScale Dir, Set – Sets or resets logarithmic scale for specified axis direction. Returns True in case of success, False otherwise.

Viewer.SeLogScale tvDirHorz, True

CopyToClip – Copies currently displayed image to clipboard. Returns True in case of success, False otherwise.

Viewer.CopyToClip