OpenDSS COM Documentation

Bus Interface

Sept 2013

This interface is used to extract the listed values from a Bus object in the active circuit after the appropriate solution is performed. Most of the properties are readonly as it is unsafe to define these properties separate from the terminal connection definitions for circuit elements.

The interface operates on the *Active Bus.* You can set a bus active using the Buses(i) property or the SetActiveBus or SetActiveBusi functions in the Circuit interface. Also, when you set an active circuit element and terminal, the bus connected to that terminal becomes active.

## Properties

|  |  |  |
| --- | --- | --- |
| **Property** | **Type** | **Description** |
| Coorddefined: | WordBool | readonly Returns TRUE if the X-Y coordinates are defined for the active bus. Else returns FALSE. |
| CplxSeqVoltages: | OleVariant | readonly Returns a variant array of doubles representing the sequence voltages in complex phasor form. Sequence order is 0, 1, 2 |
| Cust\_Duration: | Double | readonly Returns customer duration for active bus after reliability calcs |
| Cust\_Interrupts: | Double | readonly Returns customer interruptions for active bus after reliability calcs |
| Distance: | Double | readonly Returns distance in km that this bus is from the parent EnergyMeter (typically at head of the feeder.) |
| Int\_Duration: | Double | readonly Returns average interruption durations for active bus after reliability calcs |
| Isc: | OleVariant | readonly |
| Lambda: | Double | readonly Returns total annual failure rate for active bus after reliability calcs |
| N\_Customers: | Integer | readonly Returns total number of customers downline from the active bus after reliability calcs |
| N\_interrupts: | Double | readonly Returns total number of annual interruptions for the active bus after reliability calcs |
| Name: | WideString | readonly Name of active bus. Set the active bus in the Circuit interface (SetActiveBus function or Buses(i) property). |
| Nodes: | OleVariant | readonly A variant array of integers containing the order of the nodes at this bus. This is the order of the Voltages and puVoltage arrays. |
| NumNodes: | Integer | readonly Number of nodes at the active bus. |
| SeqVoltages: | OleVariant | readonly Similar to CplxSeqVoltage except voltage magnitudes only. Volts. Order is 0, 1, 2. |
| Voc: | OleVariant | readonly Open-circuit voltages after fault study. Variant array of complex voltages. |
| Voltages: | OleVariant | readonly Variant array of doubles representing complex voltage phasors, volts, (a + jb) form, for the most recent solution. |
| YscMatrix: | OleVariant | readonly Variant array of doubles containing complex short circuit Admittance matrix, column by column. |
| Zsc0: | OleVariant | readonly Zero-sequence short-circuit impedance looking into the bus. Variant array of doubles (2 values). |
| Zsc1: | OleVariant | readonly Positive-sequence short-circuit impedance looking into the bus. Variant array of doubles (2 values). |
| ZscMatrix: | OleVariant | readonly Variant array of doubles containing complex short circuit Impedance matrix, column by column. |
| kVBase: | Double | readonly Base kV for the bus. |
| puVoltages: | OleVariant | readonly Same as Voltage property except values in per unit on base kV of the bus. |
| x: | Double | X coordinate (for circuit plot) |
| y: | Double | Y coordinate |

## Functions

|  |  |  |
| --- | --- | --- |
| GetUniqueNodeNumber (StartNumber:Integer): | Integer | To help avoid collisions of neutral node numbers for specifying connections of circuit elements, this function returns a node number that is not being used, Starting at the StartNode value |
| ZscRefresh | WordBool | Refresh Zsc, Ysc values. Execute after a major change in the circuit. Not necessary after fault study. |

## Example

This VBA sub loads the present solution’s node voltages in complex form. If voltage bases are defined for the buses, the voltages are in per unit. One unique feature of this sub is that it tacks the node order onto the bus name in column 1. Then it places the voltage(s) in the cells according to the phase, or node, it corresponds to.

Public Sub LoadVoltages()

' This Sub loads the per unit complex voltages onto Sheet3 starting in Row 2

Dim DSSBus As OpenDSSengine.Bus

Dim iRow As Long, iCol As Long, i As Long, j As Long

Dim V As Variant, NodeOrder As Variant

Dim WorkingSheet As Worksheet

Dim Str As String

Set WorkingSheet = Worksheets("VoltSheet") ' VoltSheet = Sheet3

WorkingSheet.Rows("2:" & Rows.Count).ClearContents

iRow = 2

For i = 1 To DSSCircuit.NumBuses ' Cycle through all buses

Set DSSBus = DSSCircuit.Buses(i) ' Set i-th bus active using Buses

' Loads pu voltages (complex) at active bus as variant array of doubles

V = DSSBus.puVoltages

NodeOrder = DSSBus.Nodes

' Construct full bus name

Str = DSSCircuit.ActiveBus.Name

For j = LBound(NodeOrder) To UBound(NodeOrder)

Str = Str + "." & CStr(NodeOrder(j))

Next j

' Bus name goes into Column 1

WorkingSheet.Cells(iRow, 1).Value = Str

' Put values in Variant array into cells in sequence provided by DSS

iCol = 2

With WorkingSheet

For j = LBound(V) To UBound(V) Step 2

iCol = NodeOrder(j / 2) \* 2

.Cells(iRow, iCol).Value = V(j)

.Cells(iRow, iCol + 1).Value = V(j + 1)

Next j

End With

iRow = iRow + 1

Next i

End Sub

### Result in worksheet:

This is the first few rows of the solution for the IEEE 8500-node test feeder.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bus** | **Re(1)** | **Imag(1)** | **Re(2)** | **Imag(2)** | **Re(3)** | **Imag(3)** |
| \_hvmv\_sub\_lsb.1.2.3 | 0.865398871 | -0.593267853 | -0.943739082 | -0.455649678 | 0.073946307 | 1.04775717 |
| hvmv\_sub\_48332.1.2.3 | 0.865398339 | -0.593268409 | -0.943739279 | -0.455648964 | 0.073946998 | 1.047757071 |
| m1009763.1.2.3 | 0.707352037 | -0.705500302 | -0.987319644 | -0.227647038 | 0.185599725 | 1.013020715 |
| l2673322.2 |  |  | -0.987304697 | -0.227639354 |  |  |
| m1069148.3 |  |  |  |  | 0.170798901 | 1.016329408 |
| l2673309.3 |  |  |  |  | 0.17080227 | 1.016288397 |
| Etc. etc. |  |  |  |  |  |  |