

Methods for Sparse Network Parameter Treatment in Touchstone 2.x

Katz Proposal #1

[Begin Row Data]

[Row] 1

1 <name> 2 <name> 3 <name>

[Row] 2

1 <name> 2 <name> 3 <name>

[Row] 3

2 <name> 3 <name> 4 <name>

[Row] 4

3 <name> 4 <name> 5 <name>

[End Row Data]

[Transfer Functions]

<name> <touchstone file> <row> <column>

<name> <touchstone file> <row> <column>

[End Transfer Function Names]

Katz Proposal #2

- Transfer Function Enhancement

[Transfer Functions]

Touchstone <name> <touchstone file> <row> <column>

Touchstone <name> <touchstone file> <row> <column>

Pole_Zero <name> <list of poles and zeroes>

Impulse_Response <name> <V(t) waveform of Impulse Response>

[End Transfer Functions]

Mirmak Proposal #1 – Crude Banding

- [Matrix Width] – Data in file only represents “band” around diagonal
- [Matrix Width] is an integer specifying size of band on either side of diagonal
- Could be combined with other proposals
- Similar to [Matrix Format]
- Replaces relationship between [Number of Ports] and network data
- Example
 - [Number of Ports] 50
 - [Matrix Width] 10 (lower/upper half?)
 - Data is effectively a 20x20 matrix, centered within a 50x50 “space” otherwise filled with zeroes
 - [Matrix Width] must now agree with network data
 - [Number of Ports] is for the data file users actually “see”

Mirmak Proposal #2

- [Sparse Matrix Map]
- Specifies where pairs in network data “map” to larger matrix
 - Map is a matrix, of the same size as the network data
 - Each map [R,C] consists of a pair specifying [R,C] of data in final, larger matrix
- Map must contain values no larger than [No. of Ports]
- Final, larger matrix is the “real” size of the expanded Touchstone 2.0 data
- Effectively doubles the size of any given Touchstone 2.0 file, so expanded matrix must be significantly larger than network data given

Dmitriev-Zdorov #1

- For example, here is PDN (power distribution network) with two pairs of power ports, Z-parameters (4x4 matrix):

```
Z = [ V1 V1 V2 V2  
      V1 V1 V2 V2  
      V2 V2 V3 V3  
      V2 V2 V3 V3 ];
```

Possible simple description:

```
[ports 4]
```

```
[VECTOR 3]
```

```
1 : (1,1) (1,2) (2,1) (2,2)
```

```
2 : (1,3) (1,4) (2,3) (2,4) (3,1) (3,2) (4,1) (4,2)
```

```
3 : (3,3) (3,4) (4,3) (4,4)
```

```
[begin data]
```

```
freq1 real(V1) imag(V1) real(V2) imag(V2) real(V3) imag(V3)
```

```
freq2 real(V1) imag(V1) real(V2) imag(V2) real(V3) imag(V3)
```

```
....
```