SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – spread (distribute) solution frequencies between adjacent natural frequencies for modal frequency response solutions**

- **Linear or logarithmic domain; adaptive**

- **Consider the following**

Linear Spread, Cluster Factor	→	1.0, even spread
		0.25, center bias
		4.0, end bias
Logarithmic Spread, Cluster Factor	→	1.0 same as Linear
		0.25, center bias
		4.0, end bias

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – use lower and upper bound for modal freq. domain and number of freq's within each sub-domain.**

FREQ3   Frequency List, Alternate 3

Defines a set of excitation frequencies for modal frequency-response solutions by specifying number of excitation frequencies between two modal frequencies.

Format:

1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			

Example:

FREQ3	6	20.0	200.0	LINEAR	10	2.0			

Field	Contents
SID	Set identification number. (Integer > 0)
F1	Lower bound of modal frequency range in cycles per unit time. (Real ≥ 0.0 for TYPE = LINEAR and Real = 0.0 for TYPE = LOG)
F2	Upper bound of modal frequency range in cycles per unit time. (Real > 0.0, F2 ≥ F1, Default = F1)
TYPE	LINEAR or LOG. Specifies linear or logarithmic interpolation between frequencies. (Character; Default = "LINEAR")
NEF	Number of excitation frequencies within each subrange including the end points. The first subrange is between F1 and the first modal frequency within the bounds. The second subrange is between first and second modal frequencies between the bounds. The last subrange is between the last modal frequency within the bounds and F2. (Integer > 1, Default = 10)
CLUSTER	Specifies clustering of the excitation frequency near the end points of the range. See Remark *6.* (Real > 0.0; Default = 1.0)

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – define the frequencies at which a solution will be calculated using linear cluster**
  - This is an adaptive method, so the normal modes are used to define a set of intervals over which the spread or cluster is used.
  - The default value of Lin. Cluster is 1.0, which gives an even spread between adjacent natural frequencies.
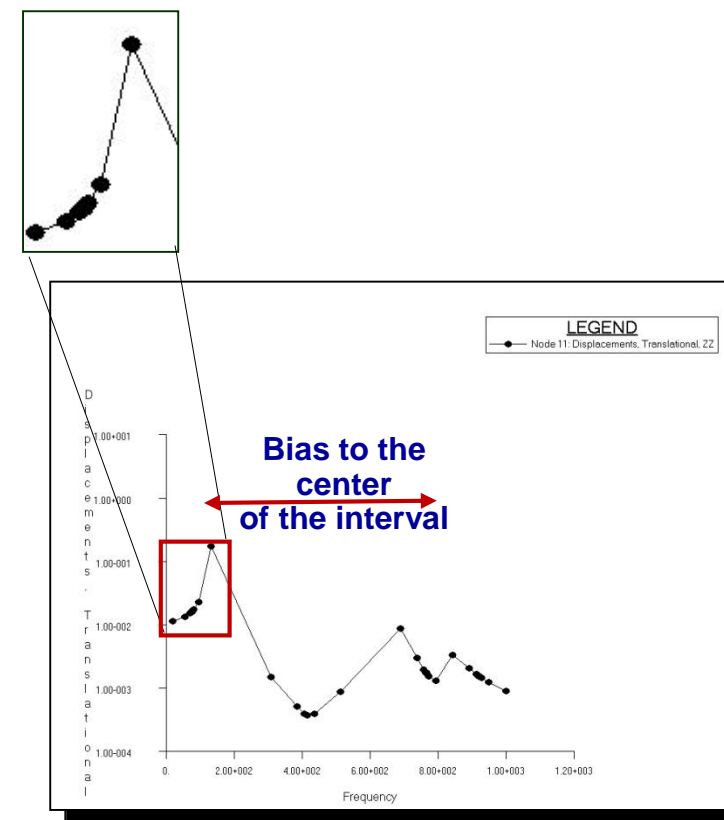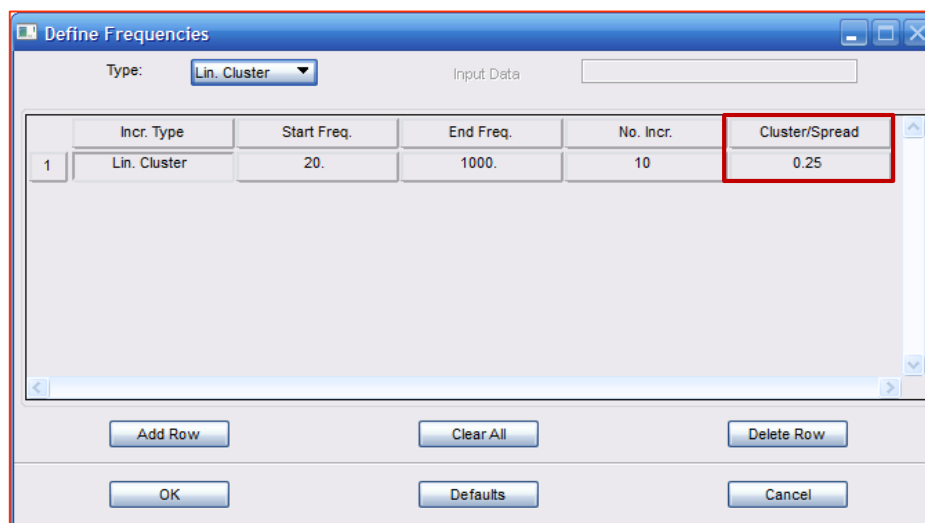 - End points 20.0Hz and 1000.0Hz are treated as ends of the first and last interval
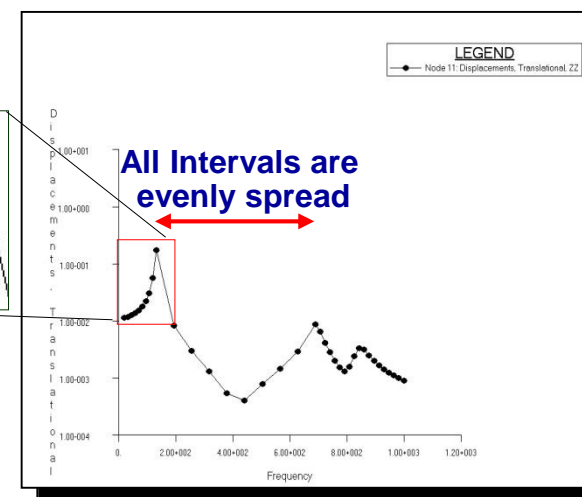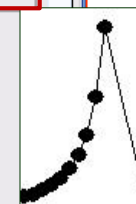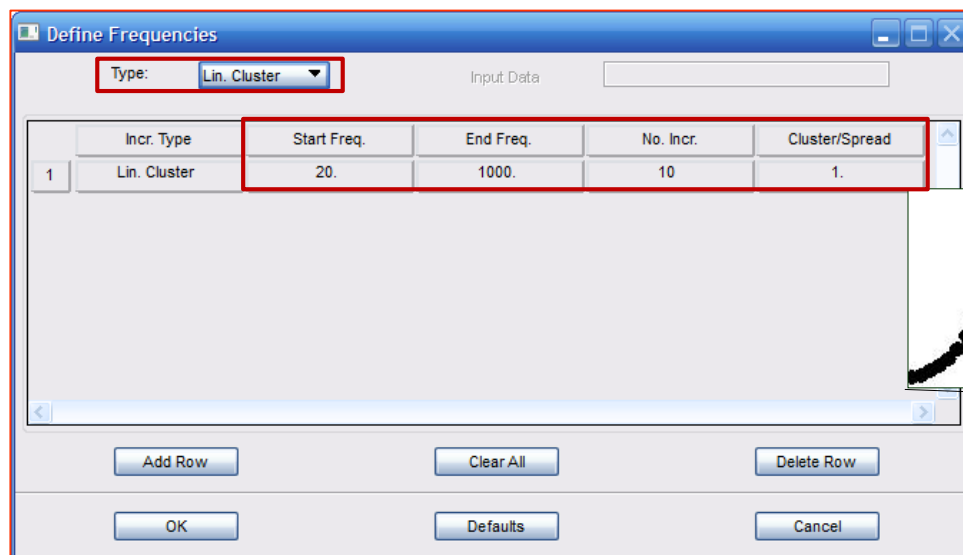
All Intervals are evenly spread

SOLUTION FREQUENCIES, FREQ3

- **The resulting FREQ3 entry from the Patran menu is shown below.**

1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			
FREQ3	1	20.	1000.	LINEAR	10				

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – define the frequencies at which a solution will be calculated using a linear cluster value of 0.25**
  - Setting Cluster/Spread less than 1.0 will bias the spread to the center of the interval.
  - A value of 0.25 is used.
 - The end points are treated as before.

Define Frequencies

Type: Lin. Cluster   Input Data

	Incr. Type	Start Freq.	End Freq.	No. Incr.	Cluster/Spread
1	Lin. Cluster	20.	1000.	10	0.25

Add Row   Clear All   Delete Row

OK   Defaults   Cancel

Bias to the center of the interval

LEGEND
Node 11: Displacements, Translational, ZZ

Displacements, Translational

Frequency

SOLUTION FREQUENCIES, FREQ3

- **The resulting FREQ3 entry from the Patran menu is shown below.**

1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			
FREQ3	1	20.	1000.	LINEAR	10	.25			

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – define the frequencies at which a solution will be calculated using a linear cluster value of 4.0**
  - Setting Cluster/Spread greater than 1.0 will bias the spread toward the ends of interval.
  - A value of 4.0 is used.
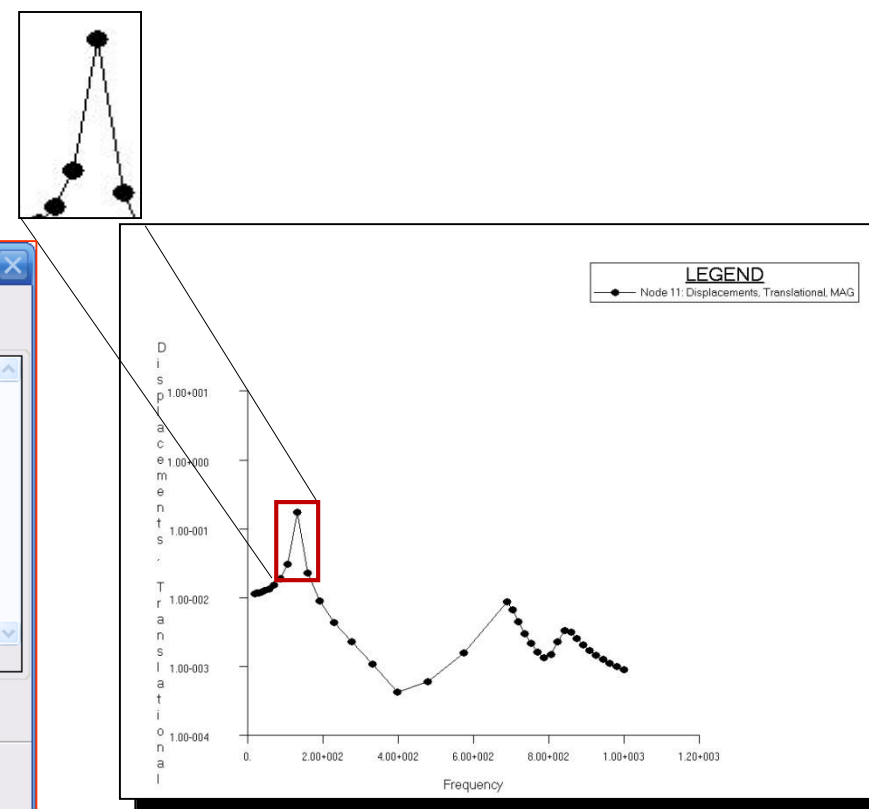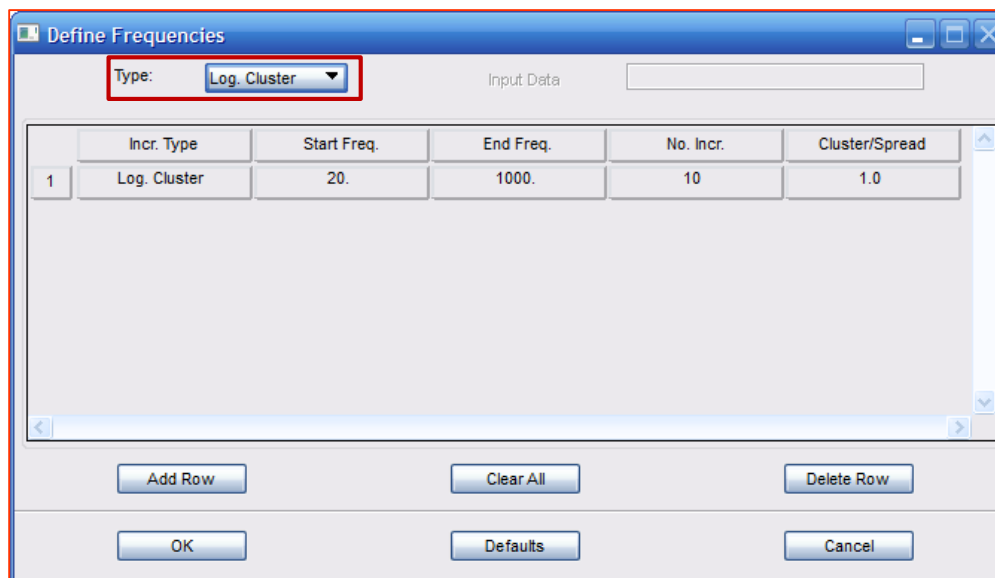 - The end points are treated as before.
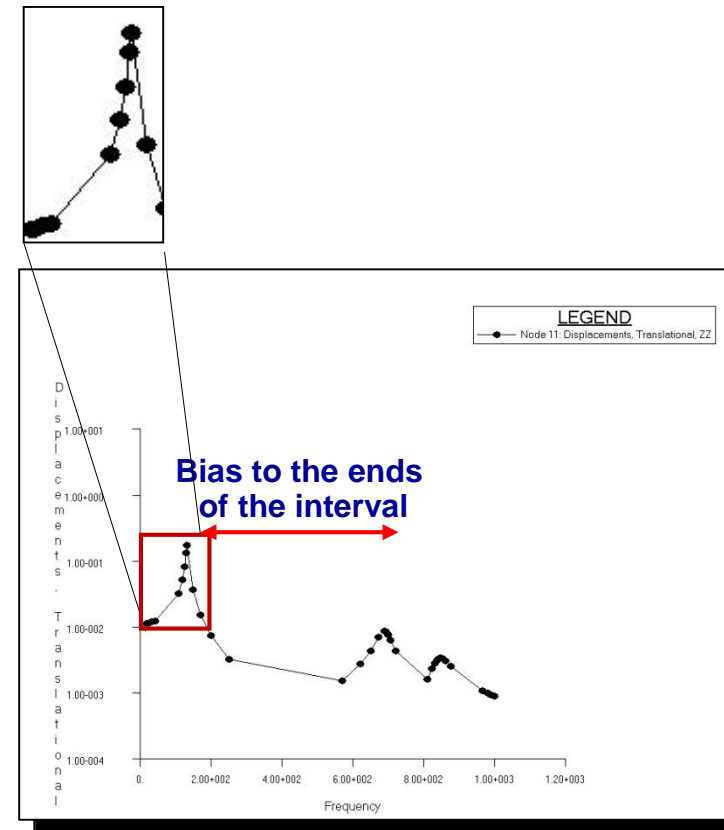
SOLUTION FREQUENCIES, FREQ3

- **The resulting FREQ3 entry from the Patran menu is shown below.**

1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			
FREQ3	1	20.	1000.	LINEAR	10	4.			

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – define the frequencies at which a solution will be calculated using log cluster**
  - When the Cluster/Spread is set to the default of 1.0, the result obtained is the same as that for Lin. Cluster.
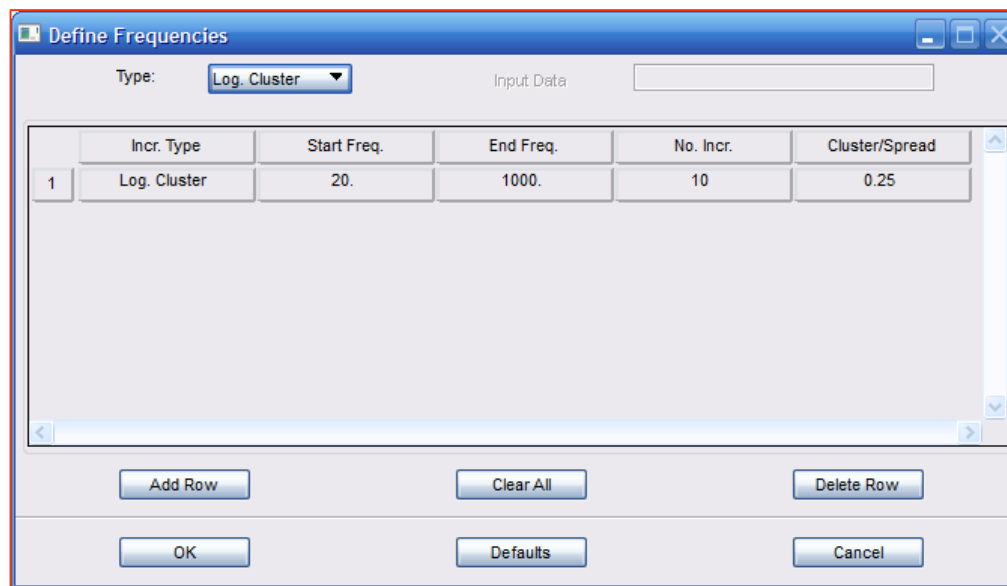
SOLUTION FREQUENCIES, FREQ3

- **The resulting FREQ3 entry from the Patran menu is shown below.**

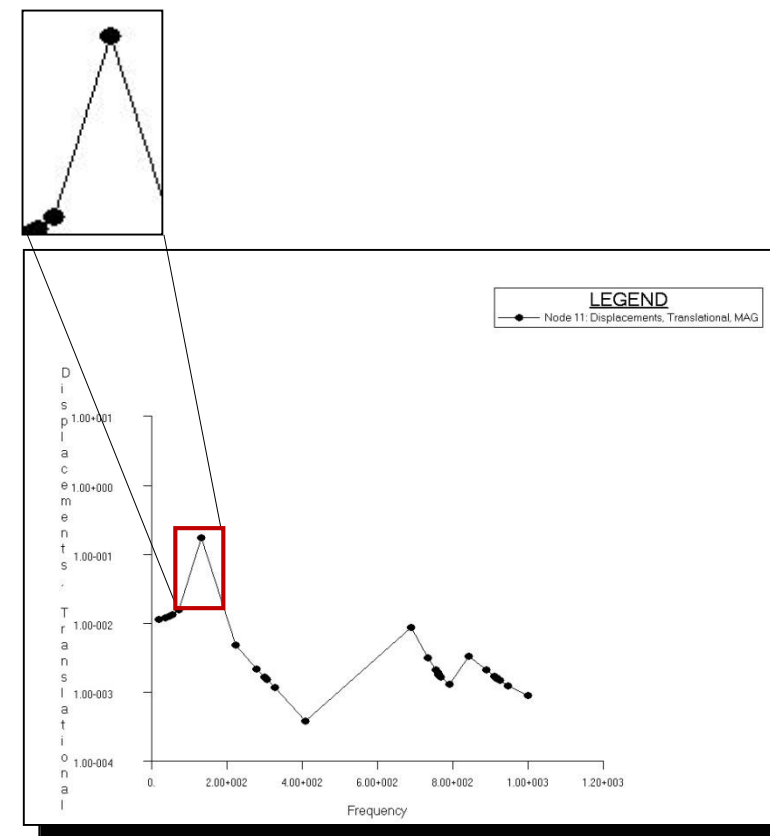| 1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			
FREQ3	1	20.	1000.	LOG	10				

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – define the frequencies at which a solution will be calculated using a log cluster value of 0.25**
  - Compare this to a previous graph to see the difference between linear cluster and logarithmic cluster.

SOLUTION FREQUENCIES, FREQ3

- **The resulting FREQ3 entry from the Patran menu is shown below.**

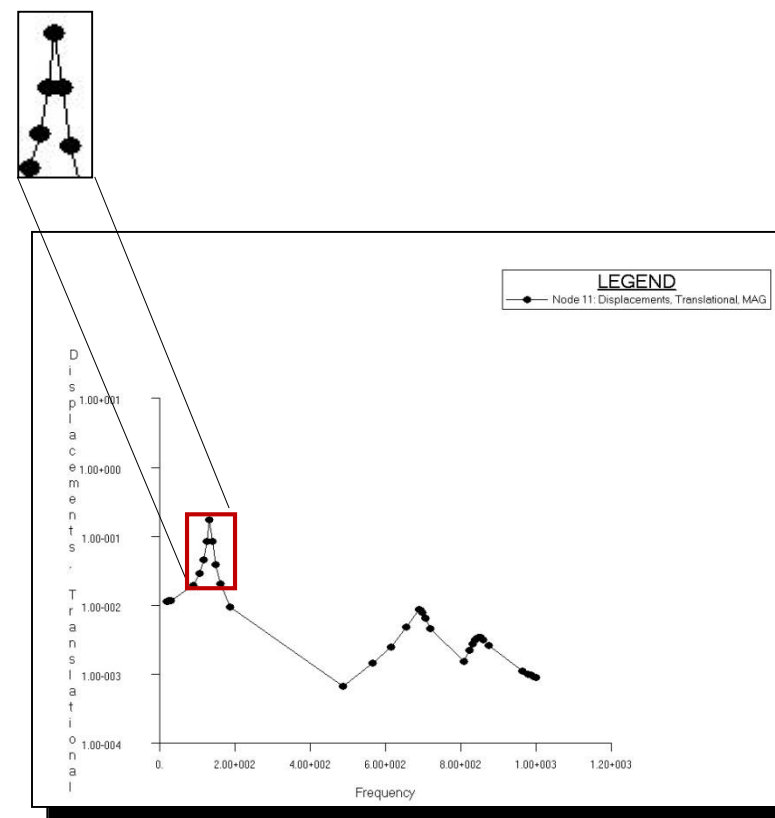| 1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			
FREQ3	1	20.	1000.	LOG	10	.25			

SOLUTION FREQUENCIES, FREQ3

- **FREQ3 – define the frequencies at which a solution will be calculated using a log cluster value of 4.0**
  - Compare this to a previous graph to see the difference between linear cluster and logarithmic cluster.

SOLUTION FREQUENCIES, FREQ3

- **The resulting FREQ3 entry from the Patran menu is shown below.**

1	2	3	4	5	6	7	8	9	10
FREQ3	SID	F1	F2	TYPE	NEF	CLUSTER			
FREQ3	1	20.	1000.	LOG	10	4.			