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| MOW 323 – Semester test 2 | Question 3 |
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1. First mode as the frequency of the animation is 5862.8 Hz as can be seen in figure 1.

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| Figure : Beam modes |

1. From figure 1 it can be seen that the 2nd mode participation factor is the highest at 0.25.

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| Chart  Description automatically generated with medium confidence  Figure : Beam modes |

1. The closest frequency in the z-direction to 4000 Hz is at mode 1 with a frequency of 5862.8 hz. This will give a frequency ratio of r = 0.682. Now considering a general FRF plot seen in figure 2. Which gives the location of a 10% static analysis error at about r = 0.35. The analysis should be transient.
2. All the rightmost nodes to the right in figure 3 have fixed displacements imposed on them. The leftmost nodes are free to move in the z direction. But are constraint to move in the x direction. The top and bottom faces are free to move in any direction they want.

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| A picture containing diagram  Description automatically generated  Figure : Beam modes |

1. Since all of the participating modes have a frequency of 0 see figure 4, it shows that the model is completely free to move and there are no boundary conditions.

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| Figure : Beam modes |

1. No, Mode shaped correspond only to the relative magnitudes of the displaced nodes. Modal analysis can be done without a loading present and therefore as no actual displacements of real magnitude.