

Finite Element method

Fixed-Free Boundary Condition

Natural frequencies:

number of elements: 5

1683.762

5218.188

9245.003

13863.331

17831.215

Finite Element method

Fixed-Free Boundary Condition

Natural frequencies:

number of elements: 10

1678.583

5077.241

8601.101

12334.335

16354.729

20710.152

25358.687

30046.997

34145.547

36641.149

Finite Element method

Fixed-Free Boundary Condition

Natural frequencies:

number of elements: 50

1676.927

5032.436

8392.913

11761.673

15142.042

18537.354

21950.955

25386.205

28846.475

32335.149

35855.617

39411.273

43005.503  
46641.679  
50323.138  
54053.168  
57834.979  
61671.673  
65566.205  
69521.334  
73539.566  
77623.080  
81773.644  
85992.512  
90280.304  
94636.864  
99061.094  
103550.760  
108102.280  
112710.473  
117368.289  
122066.511  
126793.436  
131534.554  
136272.217  
140985.340  
145649.146  
150234.986  
154710.276  
159038.592  
163179.962  
167091.405  
170727.737  
174042.662  
176990.138  
179525.976  
181609.583  
183205.747  
184286.321  
184831.659

Finite Element method

Fixed-Free Boundary Condition

Natural frequencies:  
number of elements: 100  
1676.875  
5031.040  
8386.446  
11743.921

15104.294  
18468.393  
21837.050  
25211.095  
28591.359  
31978.678  
35373.885  
38777.818  
42191.314  
45615.213  
49050.358  
52497.590  
55957.754  
59431.697  
62920.265  
66424.305  
69944.667  
73482.199  
77037.749  
80612.164  
84206.289  
87820.967  
91457.038  
95115.337  
98796.694  
102501.930  
106231.860  
109987.286  
113769.000  
117577.777  
121414.379  
125279.544  
129173.989  
133098.407  
137053.458  
141039.770  
145057.933  
149108.495  
153191.953  
157308.752  
161459.276  
165643.842  
169862.690  
174115.979  
178403.776  
182726.045  
187082.639  
191473.288  
195897.586  
200354.981

204844.758  
209366.028  
213917.709  
218498.512  
223106.925  
227741.191  
232399.294  
237078.937  
241777.523  
246492.135  
251219.513  
255956.037  
260697.705  
265440.113  
270178.433  
274907.402  
279621.299  
284313.934  
288978.635  
293608.243  
298195.101  
302731.063  
307207.493  
311615.276  
315944.842  
320186.186  
324328.902  
328362.226  
332275.086  
336056.158  
339693.942  
343176.830  
346493.199  
349631.500  
352580.364  
355328.699  
357865.812  
360181.511  
362266.224  
364111.108  
365708.157  
367050.299  
368131.491  
368946.796  
369492.451  
369765.917

Fixed-Fixed Boundary Condition

Natural frequencies:

number of elements: 5  
7152.242  
11503.370  
16113.527

Fixed-Fixed Boundary Condition

Natural frequencies:

number of elements: 10  
3367.524  
10436.376  
14304.483  
18490.007  
23006.740  
27726.661  
32227.054  
35662.431

Fixed-Fixed Boundary Condition

Natural frequencies:

number of elements: 50  
3354.268  
6711.847  
10076.050  
16837.622  
20241.659  
23665.664  
27113.001  
30587.050  
34091.197  
37628.834  
41203.355  
44818.138  
48476.541  
52181.879  
55937.404  
59746.277  
63611.531  
67536.031  
71522.417  
75573.041  
79689.889  
83874.484  
88127.782  
92450.033  
96840.631

101297.937  
105819.071  
110399.686  
115033.700  
119713.018  
124427.223  
129163.247  
133905.051  
138633.305  
143325.106  
147953.757  
152488.639  
156895.226  
161135.269  
165167.208  
168946.843  
172428.277  
175565.156  
178312.154  
180626.656  
182470.538  
183811.924  
184626.759

Fixed-Fixed Boundary Condition

Natural frequencies:

number of elements: 100  
3353.854  
6708.536  
10064.873  
13423.693  
16785.826  
20152.100  
23523.347  
26900.397  
30284.085  
33675.243  
37074.708  
40483.318  
43901.911  
50772.410  
54226.003  
57692.950  
61174.100  
64670.298  
68182.393  
71711.234  
75257.669

78822.545  
82406.710  
86011.006  
89636.276  
93283.357  
96953.082  
100646.276  
104363.758  
108106.336  
111874.808  
115669.958  
119492.553  
123343.345  
127223.063  
131132.409  
135072.063  
139042.668  
143044.835  
147079.132  
151146.083  
155246.160  
159379.777  
163547.287  
167748.969  
171985.023  
176255.564  
180560.608  
184900.065  
189273.729  
193681.262  
198122.187  
202595.873  
207101.520  
211638.143  
216204.559  
220799.371  
225420.946  
230067.399  
234736.578  
239426.037  
244133.021  
248854.446  
253586.873  
258326.494  
263069.108  
267810.102  
272544.433  
277266.610  
281970.680  
286650.212

291298.293  
295907.513  
300469.973  
304977.278  
309420.553  
313790.452  
318077.184  
322270.538  
326359.924  
330334.417  
334182.811  
337893.685  
341455.475  
344856.554  
348085.324  
351130.313  
353980.276  
356624.309  
359051.952  
361253.312  
363219.166  
364941.077  
366411.494  
367623.849  
368572.643  
369253.518  
369663.317