Appendix B

Supplementary Exercises

The following exercises are provided for the user who would like to practice with more problems. The descriptions are detailed with step-by-step directions like those provided in the first set of exercises.

For the problems in this appendix, the user is expected to create the entire analysis model(including geometry, finite element mesh, loads and boundary conditions, material properties, element properties, load cases, fields), and perform the necessary analysis and verify the results provided. The things that are to be done for each of the problems is described below.

Animation With Insight -- animate the first mode of an annular plate, then, animate the next three modes. Also, create a fringe plot for a componate of displacement for a mode.

Pitman arm -- create extensive geometry for the model, various loading conditions and the corresponding fields, and run two analyses and view the displacement and stress results.

Stiffened Plate With Pressure Loading -- create simple geometry, finite element mesh using 1D(T-beam stiffiners) and 2D elements(bending shells), symmetry boundary conditions, and perform an analysis and view the displacement and stress results.

Thermal Block -- this analysis is for use with the thermal solver MSC.Patran Thermal; create simple geometry and a finite element mesh using solid hex8 elements, various boundary conditions(bc)(e.g. temperature, heat flux, etc.), and perform an analysis each time a bc is created and added to the model via load case. This helps the user to become accustomed to creating this type of model and seeing the effects that adding different bc has on the obtained solution.

Pipe Elbow -- create moderarely complicated geometry for a pipe elbow with an intersecting circular tube, finite element mesh consisting of a mix of tetrahadral and wedge solid elements, loads and bc that involves some modestly challenging picking, and perform an analysis and view the results.

Helical Spring -- create geometry that represents two revolutions of a helical spring, a tetrahedral finite element mesh, constraints on one end of the spring anf loads on the other end, and perform and analysis and view how the spring deforms due to the loading.

MSC.Nastran Thermal Block -- this problem is the same as that for the above

described Thermal Block problem for MSC.Patran Thermal. The only difference is that MSC.Nastran Thermal is used. Of course, the Patran entries look different in some areas.