2.31 Project 3
Ghost eyestrain

Due October 31

Ghosts have very big eyes. As they float around on Halloween night with their damp heavy cloths and rusty chains, they have to withstand very high stresses around the eyes. The New England Ghost Association (NEGA) has commissioned a preliminary study to determine if all the ghosts that have been calling in sick with eyestrain complaints are just faking it in order to avoid the extra work on the 31st, or if they have actually been carrying more than their fair load of chains. You have to perform a preliminary FE analysis on a 2D plane stress ghost model to estimate the actual level of eyestrain (E22). You can assume that the ghost model is made of linear elastic material, with $E=1\text{MPa}$, and $\nu=0.35$. Also, to simplify your life, you can simulate the loading effects of dragging chains, and damp cloth as a surface traction on the bottom edge of the ghost. In order to prevent the ghost from floating around, you may want to put displacement constraints around the top of the head. In the figures, I am showing my first attempt at ghost modeling, but you do not have to follow the same geometry and loading conditions, as each and every ghost is quite different, and there are really no standards. Just set up your own ghost model, by choosing the geometry and the loading conditions, and then work with your mesh and element type up to when you are confident that the stress you are getting is a reasonable estimate. For your own ghost model determine what is the maximum weight the ghost can carry (per unit depth), if the max strain around the eye is limited to 5%. Discuss your findings in a report to NEGA, and get ready to present your work on the 31st. If you need any help and/or advice, stop by my office or send me e-mail.