

# In-class assignment #11

PHY-905-005

Computational Astrophysics and Astrostatistics  
Spring 2023

**Instructions:** Solve the same problem from the pre-class assignment (the distortion of a bench due to a person sitting on it, as described in equations 7.64 and 7.67 of Pang) using the relaxation method (Section 7.5 of Pang). For boundary conditions, try both the Dirichlet (set functional values) and Neumann (first derivative) methods. Pick a variety of different initial guesses for  $u(x)$  (A good first guess is  $u(x) = 0$  everywhere, but be creative) and see how your estimate for  $u(x)$  and the residual change for each iteration, assuming a desired tolerance of  $10^{-4}$ . By how much does the number of iterations vary depending on your initial guess for  $u(x)$ ?

**Handing it in:** Turn in all materials via GitHub. Include your code, plots, and anything else that you used to complete the assignment!