PHY983 - Nuclear Astrophysics - Spring 2009
Homework Set 6
Due: Feb 27, 2009 at beginning of class
Key words: CNO cycle

1. [6pts] Calculate the flux of CN cycle neutrinos from the sun expected on earth (number
    of neutrinos per square centimeter and second). Use the conditions and composition
    in the center of the sun from solar model BS2005-AGS,OP
    (http://www.sns.ias.edu/~jnb/ and click through Solar Neutrinos - Solar models).
    You can neglect any CNO side branches, just use the main CN cycle.

2. [6pts] Calculate for comparison the total neutrino flux from the sun expected on earth.
    Do this based on energetics, using the known solar luminosity and the fact that all the
    energy is generated by fusion of hydrogen into 4He. You can assume the sun is in a
    thermal steady state

3. [6pts] Show, using the composition in BS2005-AGS,OP that the main CN cycle in the
    sun is in steady state (in terms of the abundances involved), using the reaction rates
    from the JINA reaclib site. There are small corrections to the rates due to the stellar
    environment so this will not work out perfectly.