Physics 566 Problem Set #3
Reading: CP Chapters 5
Available February 1st
Due February 14th

Please follow the guidance of last week and, like before, please turn in (by attachment in the Sakai assignment) both a PDF exported version of the notebook and the .ipynb file itself. You will need to have read and understood the material at least through section 5.8. If you need to work out new equations etc for the problem please use LaTeX formatting to show what you did in your answers.

(1) CP 5.3 [Gaussian Error Function. Use the trapezoidal rule for this problem.]

(2) CP 5.4 [Diffraction limited telescopes with Simpson's rule]

(3) CP 5.7 [Romberg Integration]

Note for the Gaussian quadrature problems below you can use the functions in http://www-personal.umich.edu/~mejn/cp/programs/gaussxw.py (or in scipy) to calculate integration points and weights for Gaussian quadrature.

(4) CP 5.9 [Heat Capacity using Gaussian quadrature]

(5) CP 5.10 [Period of an anharmonic oscillator with Gaussian quadrature]

(6) CP 5.11 [Diffraction around edges with Gaussian quadrature]

(7) CP 5.12 [The Stefan Boltzmann constant with Gaussian quadrature]

(8) CP.5.13 [Quantum uncertainty in the harmonic oscillator with Gaussian quadrature]

(9) CP 5.19 [Diffraction gratings. I suggest using Simpson's rule for this problem. Gaussian Quadrature will require a very large number of points.]