Extra Credit Topics

For each topic, a quantitative essay of 3-5 pages is needed. The essay should be critical and analytical – this is not a book report.

i.)   Compare/contrast the H-exponent, the Gini coefficient and the Kurtosis. How might each characterize a distribution of wealth or income?

ii.)   There are numerous experimental studies of H-exponents in plasma turbulence and transport – see papers by Van Milligan, Carreras, et al. Critique these. What do we really learn from them? What else might be done? How might we improve our insights into transport?

iii.)   Consider a stochastic process with time variability. How might one modify kinetic theory to accommodate such variability? How does one distinguish between a case where $D=D(t)$ and a truly non-Brownian system?

iv.)   Summarize the Bourret approximation for attacking stochastic ODE's (see Brissaud, Frisch; J. Math. Phys. 1974). How does it compare to familiar turbulence closure methods? How do B and F approach the $Ku > 1$ regime? What gives them leverage?