Physics 831 - 2002
Statistical Physics
Problem Set 5

1. Use the steepest descent method to calculate the Gamma function \( \Gamma(z + 1/2) \) for large \( z \) (5 pt)

2. Problem 6.4 for identical gases (3 pt)

3. For a classical system of interacting non-relativistic atoms of mass \( m \) at temperature \( T \), find the probability density for an atom to have a kinetic energy \( \varepsilon \). Find the average kinetic energy and the root mean square fluctuation of the kinetic energy (6 pt)

4. Problem 7.4 (6 pt)

5. Problem 7.6 [the problem is about atoms, not molecules] (6 pt)

6. Problem 7.5 (6 pt)