M E 433	Professor John M. Cimbala	Lecture 38
Today, we will:		
• Discuss particle statistics: grouped data vs. listed data, histograms, PDFs, and cumulative		
distribution fun	ctions	

• Analyze in detail a sample of polluted air from Hinds' air pollution book. See class handout, and also the posted Excel spreadsheet on the course website.

Example: Converting from mass distribution to number distribution

Given: A cascade impactor is used to sample air in a city during a temperature inversion. Tray number 5 of the impactor weighs 13.20 mg clean. After the sample is taken, the same tray (with collected particles) weighs 13.32 mg. This tray (Tray 5) has been calibrated to collect particles between 4 and 6 microns. Assume unit density spherical particles ($\rho_p = 1000 \text{ kg/m}^3$), and that the air is at STP, $\rho = 1.184 \text{ kg/m}^3$, $\mu = 1.849 \times 10^{-5} \text{ kg/(m s)}$.

To do: Estimate the number of particles collected on Tray 5. *Hint*: We approximate *all* the particles on Tray 5 as having the *middle* diameter in its range, i.e., 5 microns (half-way between 4 and 6 microns). Give your answer in millions of particles to 3 significant digits.

Solution:





