

Physics 567

Homework problem 6

To be discussed in class Friday, April 20, 2007.

Suppose we make  $N$  measurements:

$$x_i = x + \epsilon_i,$$

where  $\epsilon_i$  is random noise from the distribution

$$P(\epsilon) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\epsilon^2/2\sigma^2}.$$

We now consider using either a mean or a median to estimate  $x$  from the data.

1. What is the probability distribution for the mean value of the data,  $P(\bar{x})$ ?
2. What is the probability distribution for the median,  $P(\bar{x}_M)$ ?
3. How much “better” is the mean than the median for data with normally distributed errors?