

ME 120 Experimental Methods

Homework #10: Dynamic Signal Analysis and Sound Measurement

1. (5 pts) Two uncorrelated sound sources have sound pressure levels of 83 dBA and 85 dBA respectively. If both sources are turned on, what will the total sound pressure level be? (Remember from lecture that the definition of a decibel for sound pressure measurement is $20\log(P_{\text{rms}}/P_0)=10\log(P_{\text{rms}}/P_0)^2$. Also, this link may be helpful to you: http://physics.mtsu.edu/~wmr/log_4.htm).
2. (10 pts) A signal from a sensor has its largest amplitude component at 3 kHz frequency. A co-worker of yours said he sampled the signal with a data acquisition device at 5 kHz, and analyzed the frequency components of the sampled signal. He said that the largest amplitude component was not at 3 kHz.
 - a. What frequency do you expect that your co-worker saw as the largest amplitude component in the sampled frequency spectrum?
 - b. What could your co-worker have done to avoid being misled as he was?