

Assignment #3, Biomed ECE4610, Due Oct. 9, 2012

1. It is believed that EMG signals under an isometric-isotonic contraction have a normal distribution. How can you investigate it experimentally?
2. Assuming a normal distribution for EMG signal, prove that the mean of the rectified signal is indeed a scale of its rms value.
3. What is the difference between the action potential traveling through an axon and those in skeletal muscles?
4. Describe what happens to the EMG signal's spectrum as the muscle fatigues; explain the rationale behind it. Does this effect change if the EMG is recorded by intramuscular electrodes or by electrodes on the surface? Why?
5. **A)** By observing the EMG signals of a particular muscle of interest, how can you speculate about that muscle's fiber type? **B)** Does it matter if we observe the muscle's activity in low or high contraction levels? Why? **C)** Does it matter if we observe the muscle's activity during fatigue or non-fatigue condition? Why?
6. Derive V_o of the following circuit in terms of V_1 and V_2 . Then, derive its A_d and A_c and hence CMRR.

