AE6705 Lab 7: Stepper Motor Control

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1. *At what frequency of excitation does the stepper motor fail to move anymore (in a predictable way)? (You can determine this by increasing the frequency of excitation from 20 Hz to something higher). Explain why this occurs.*
   I incremented the frequency of the timer by 100 Hz at a time and the motor stopped responding to the buttons when I changed the frequency from 600 Hz to 700 Hz. This happens because the mechanical device acts as a low-pass filter and attenuates input frequency that's higher than its cutoff frequency.

2. *What happens if two consecutive coils are energized simultaneously, i.e. if A1:B1 are energized, then B1:A2 are energized and then A2:B2 and so on (A1B1-B1A2-A2B2-B2A1-A1B1). What happens to the torque as compared to A1-B1-A2-B2-A1? What is this method of excitation called?*
   Activating two phases at a time is called full stepping actuation, which would result in higher torque.

3. *Consider the use of half stepping excitation. What happens to the torque in each step when using half-stepping operation with a unipolar motor?*
   Half stepping combines wave drive and full stepping so it alternates between activating one phase and two phases at a time. It yields smaller stepping angle and more torque than wave drive but less torque than full stepping.