

EE 432-1, Digital Control Systems, Design Project

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Design of a stepper motor control circuit

Stepper motors are the backbone of digital devices such as hard disk drives and CD ROMS. This project is meant to familiarize you with this important type of motors and the electronic circuitry needed to control it. In this project you are supposed to do the followings:

- 1- provide background on how stepper motor works, their application, and how they are controlled,
- 2- Suggest two control circuits: one to make the motor rotate at an angular speed ω_r , and the other to drive its position from zero to the angle θ_r .
- 3- simulate the suggested circuits using circuit simulation program such as: circuit maker, P/H-spice, Tutsim, etc,
- 4- write a complete report about what you did.

Individual work is only allowed.

Bonus (9/6 extra marks)

You may get extra credit by physically building the position control circuit. The grading of this optional part will be strict. If you are interested in the bonus, you are required to:

- 1- provide a working circuit and demonstrate it
- 2- document all your work in a report that contains the components used, the layout of the circuit, and the experimental results
- 3- you must also prepare a short presentation of the work during which you will have to answer questions about the implementation
- 4- you may work in pairs. In this case each student will get a maximum of six extra marks. If you chose to work alone you will get a maximum of 9 extra marks.

Again marking will be strict for this part. If you are not sure you will be able to build a working circuit you are strongly advised not to invest time on this part.