Control of a Single-Phase Claw-Pole Machine
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Motivation
- A power electronic speed controlled driver for a single-phase claw-pole machine is needed.
- The goal of this masters thesis is to design
  - the power electronic converter,
  - the signal electronics and
  - the code for a possible micro processor.

Development of control strategy and circuitry
- Selection and implementation of position detection
- Selection and development of starting sequence
- Control routine for the high speed operation
  - Delay compensation
  - Shaping of current waveform
- Simulation models are made in Simulink and partly tested in dSpace
- Practical control algorithm written in C-code

Experimental work
- Development and testing of electronic circuitry
- Verification of control strategies

Static characteristics
- Measurement of torque as a function of position and current
- Analysis of starting capability
  - Friction, cogging, etc
  - Resting positions
  - Starting torque and energy

Simulations
- Development of machine model
- Development of drive system
  - Brushless DC-drive (BLDC) with maximum current observation
  - Sampled current control (SCC) with PE regulator and PWM
  - Direct current control (DCC) with hysteresis regulator
- Theoretical evaluation of control strategies

Dynamic characteristics
- Estimation of machine output as a function of speed

Accomplishments
- Developed and verified control strategy for starting and running the motor in a controlled direction and at a controlled speed