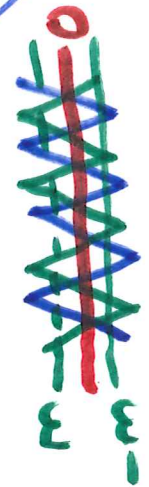
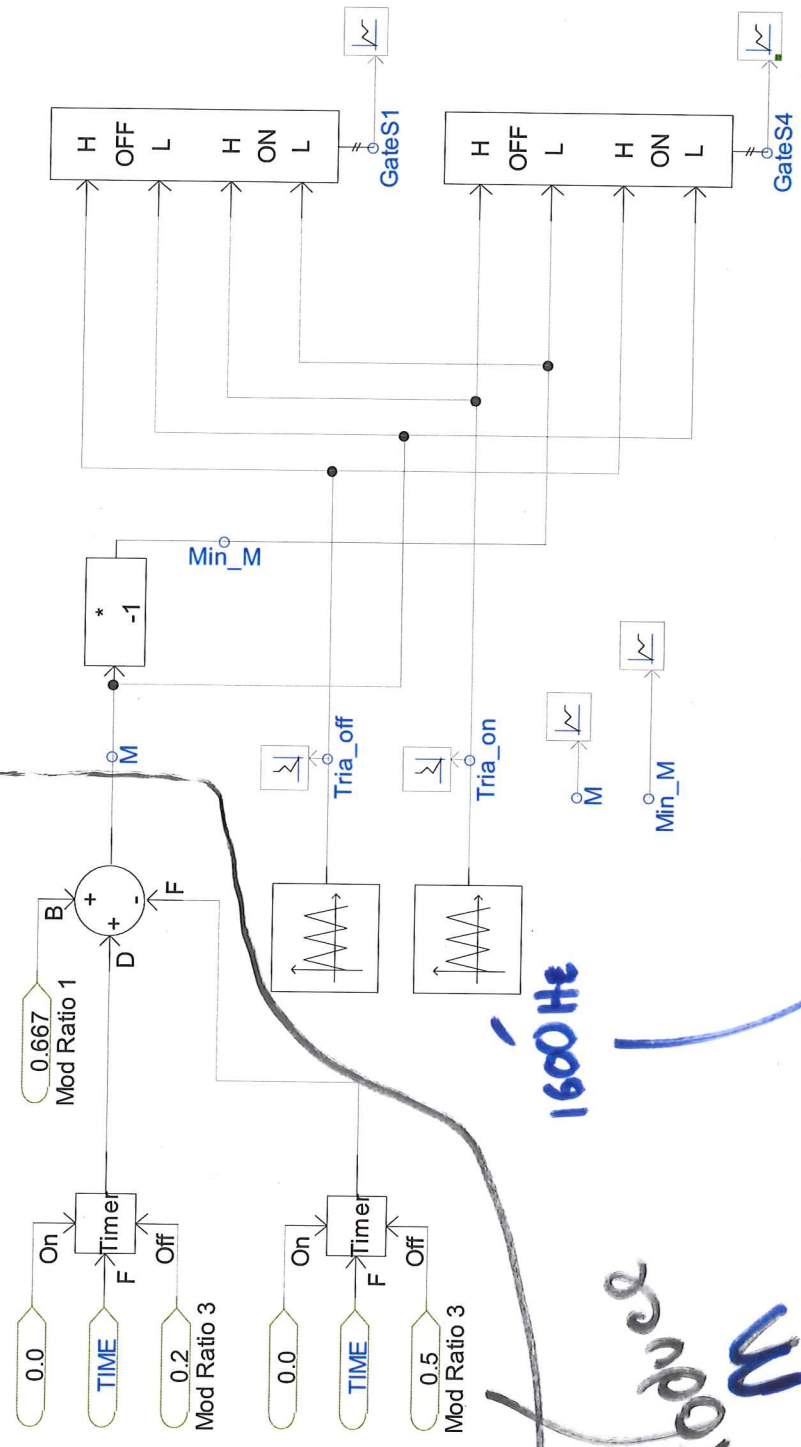


ECE 404-TD / 504-TD

ST: T&D APPLICATIONS OF
VOLTAGE SOURCE CONVERTERS

SESSION no. 32

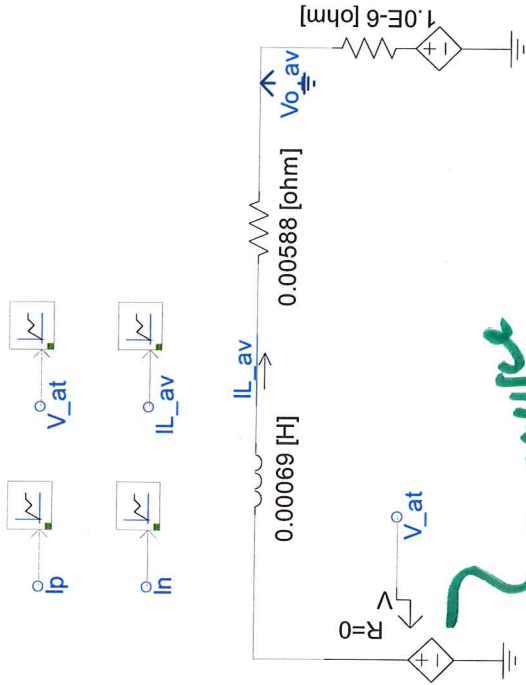
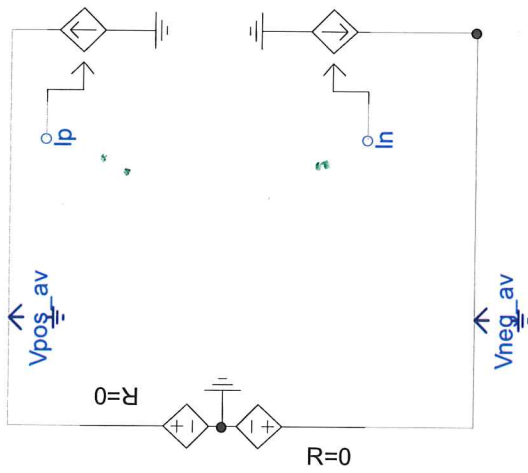
• Gate Control and Modulation



Generate pulses

produce M

• Averaged Model: Power Circuit

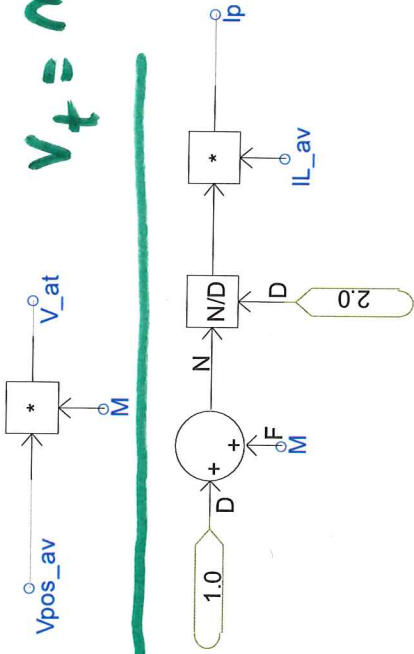


*DC source
external
inductor*

L3P 3/6

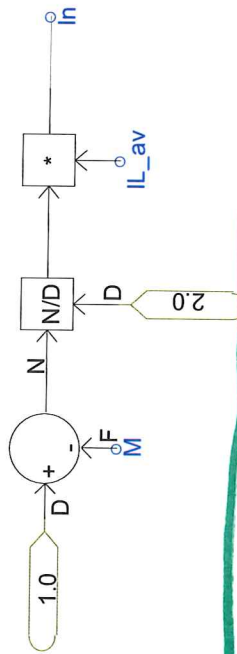
- Averaged Model: Control Equations

$$V_t = m \frac{V_{dc}}{2}$$

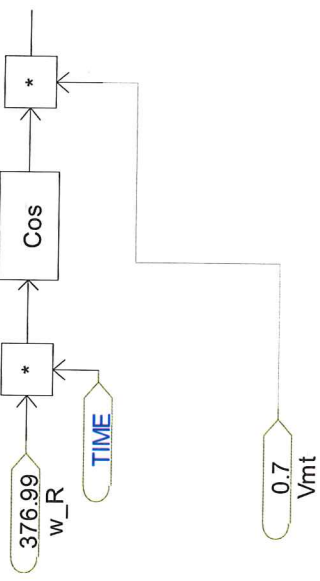


$$i_p = \left(\frac{1+n}{2} \right) i_{out}$$

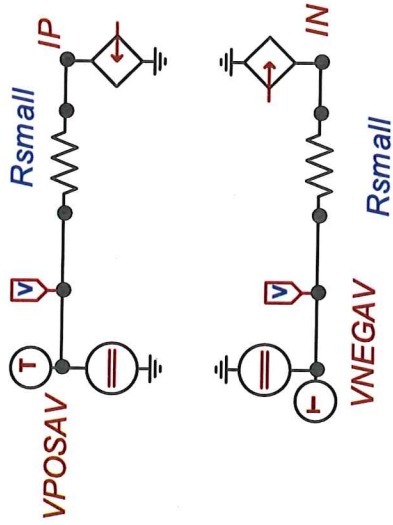
$$i_n = \left(\frac{1-n}{2} \right) i_{out}$$



- Inverter Case: Change sources and modulation function

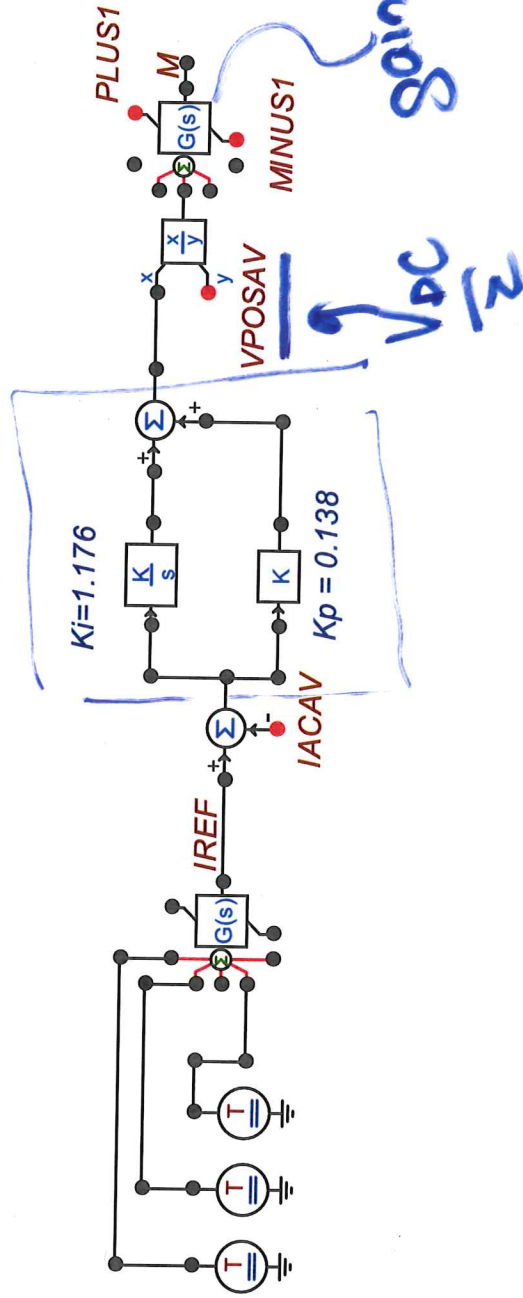
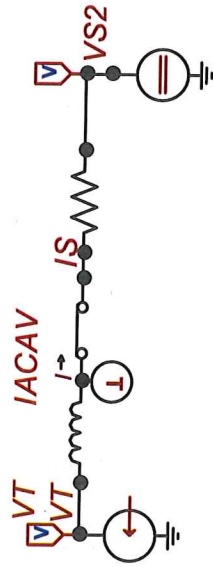


- Closed loop control (DC-DC first)
 → Add control measurements



→ Control circuit

Averaged Model



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U_I Input Filtering and Phase Correction ECE 404/504
Lecture 32

Synchronization 1 Spring 2013

U_I Synchronization ECE 404/504
Lecture 32

- Detect zero crossing of input fundamental frequency waveform
 - » Possibly delay by 90 degree to get peak
 - » Proper delay requires knowledge of actual system frequency (not the ideal value)
 - » Inputs include phase error (from measuring circuit and system drift), and base frequency
- Note use of “analog” signals, could do this digitally as well

Synchronization 2 Spring 2013

