


NPTEL ONLINE CERTIFICATION COURSES

DIGITAL CONTROL IN SMPCs AND FPGA-BASED PROTOTYPING

Dr. Santanu Kapat
Electrical Engineering Department, IIT KHARAGPUR

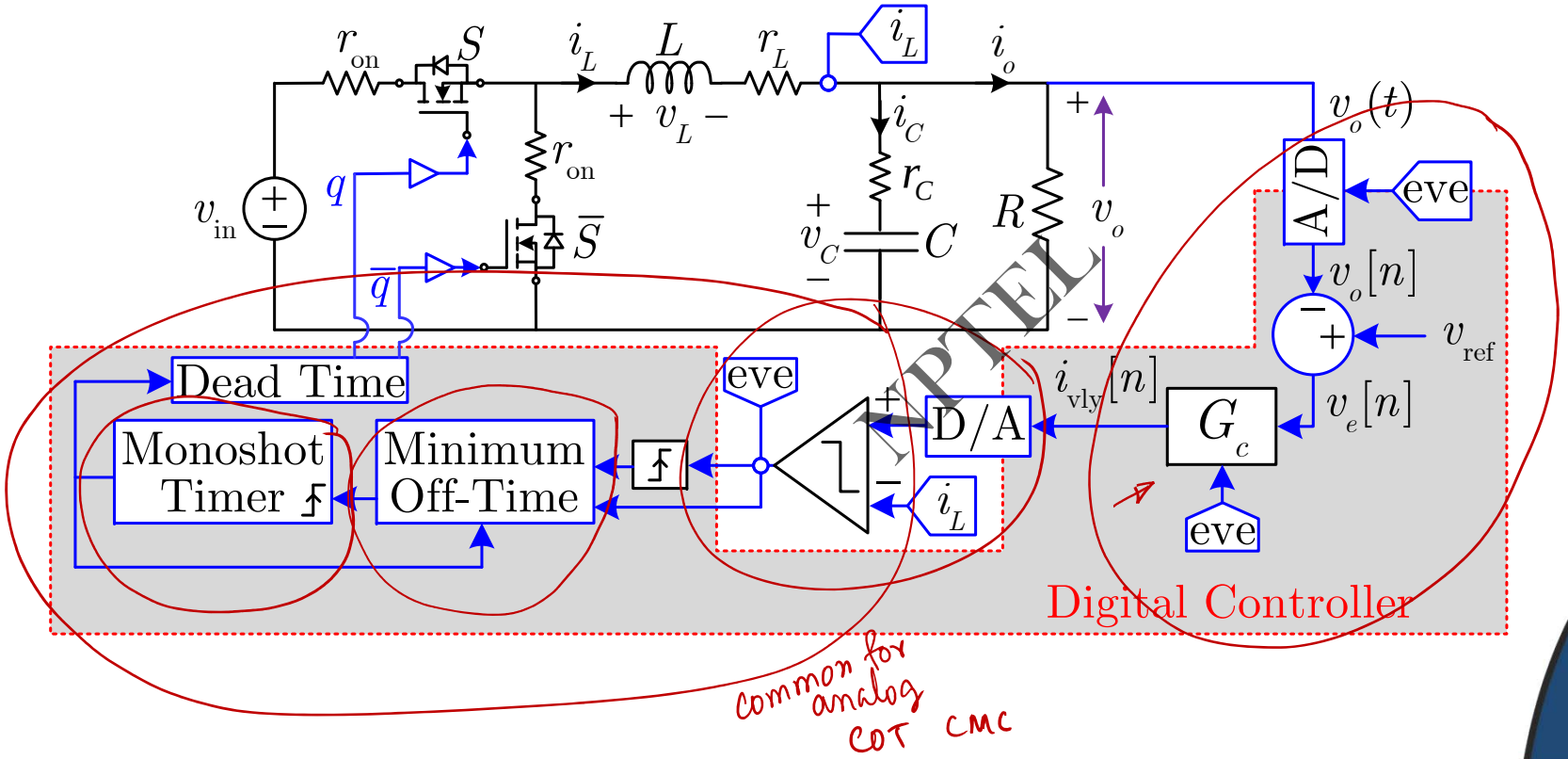
Module 03: MATLAB Custom Model Development under Digital Control

Lecture 28: MATLAB Model Development for Constant-On Time Control

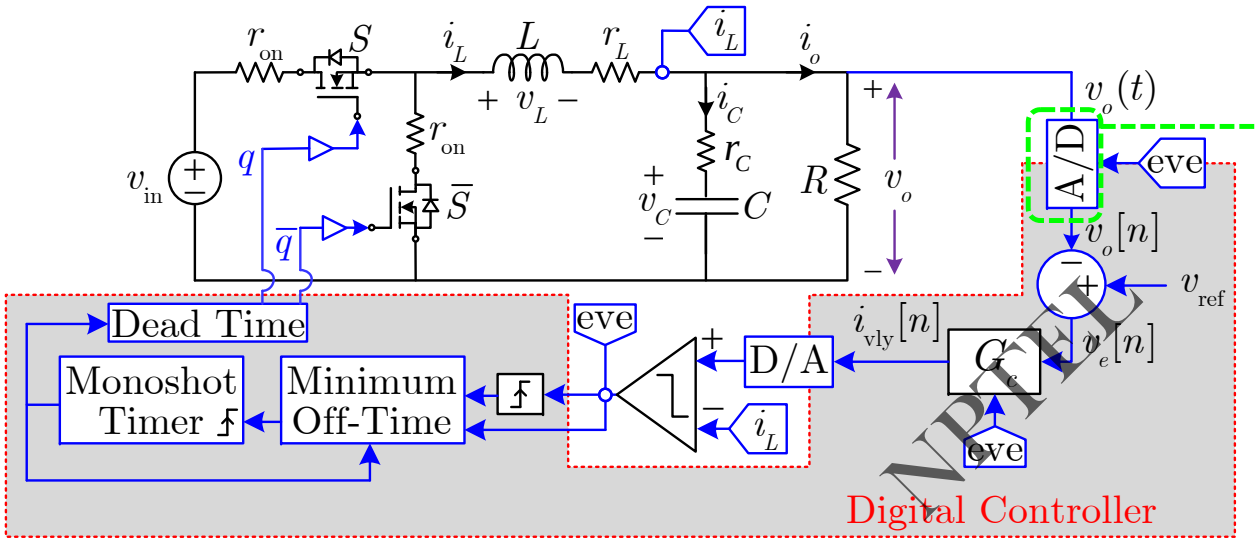
CONCEPTS COVERED

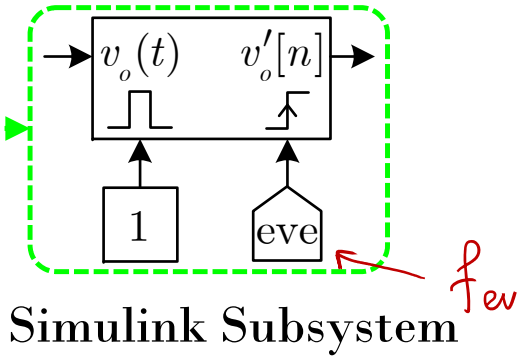
- Custom MATLAB model development for constant on-time mixed-signal CMC
- MATLAB simulation studies

Mixed-Signal Current-Mode Constant-On Time Control



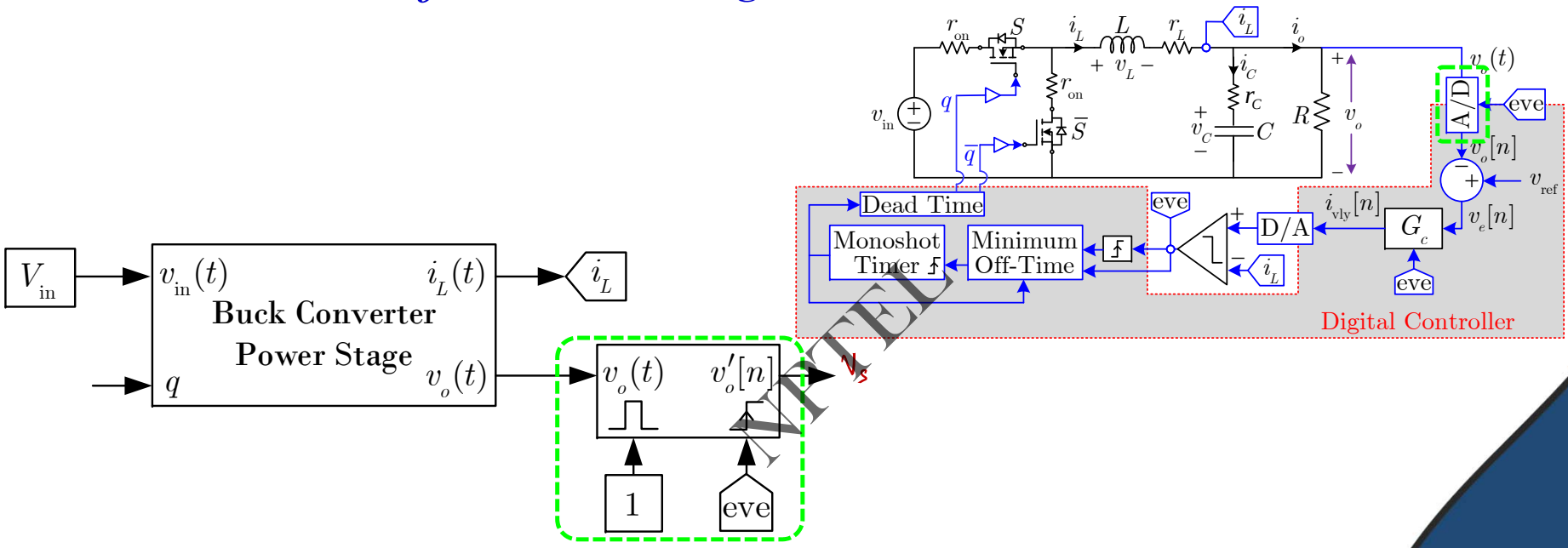
Analog to Digital Converter (ADC)



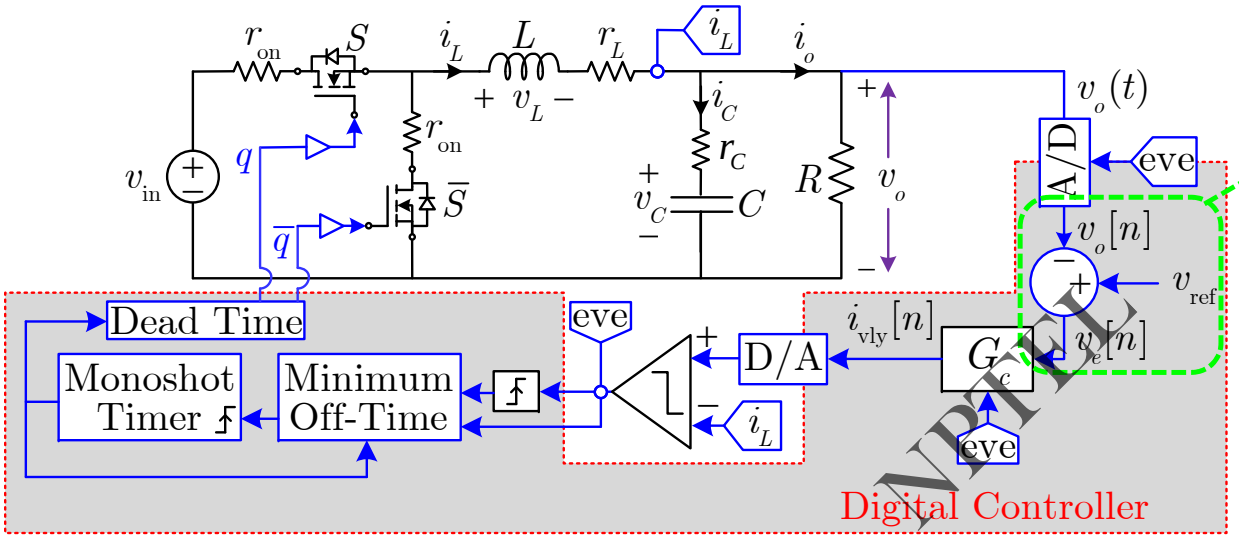


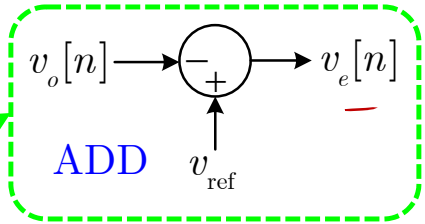
Simulink Subsystem

MATLAB Model for Mixed-Signal Constant-On Time Control



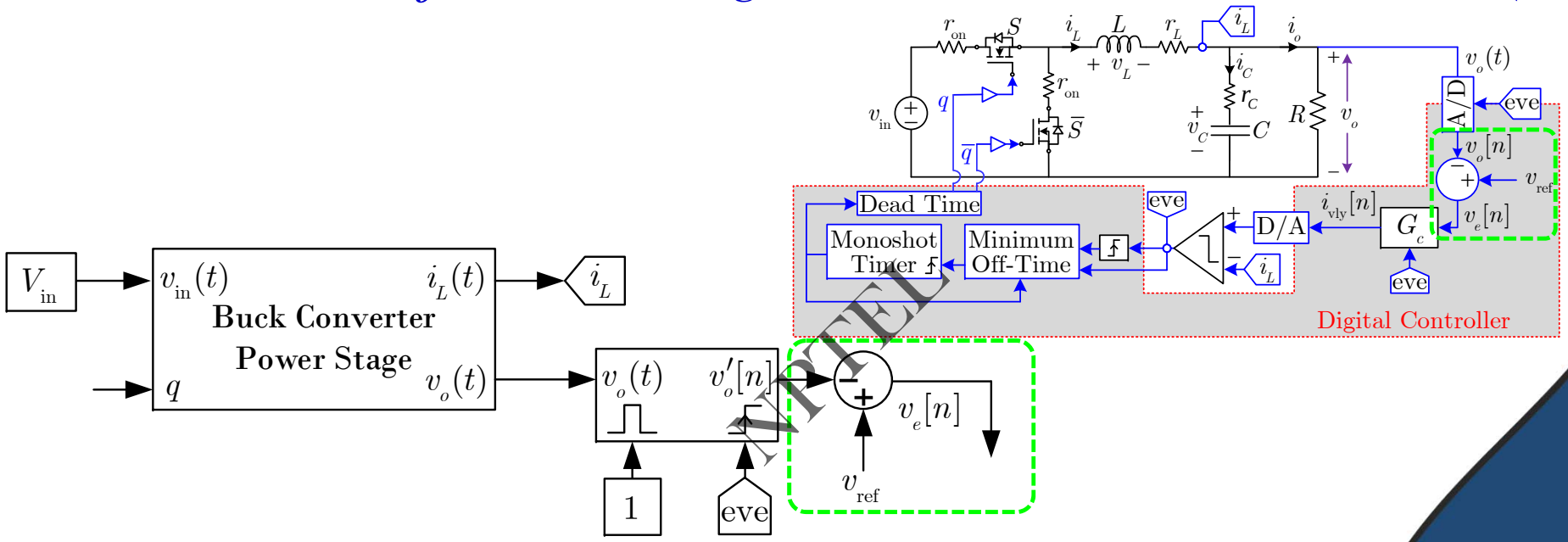
Voltage Error



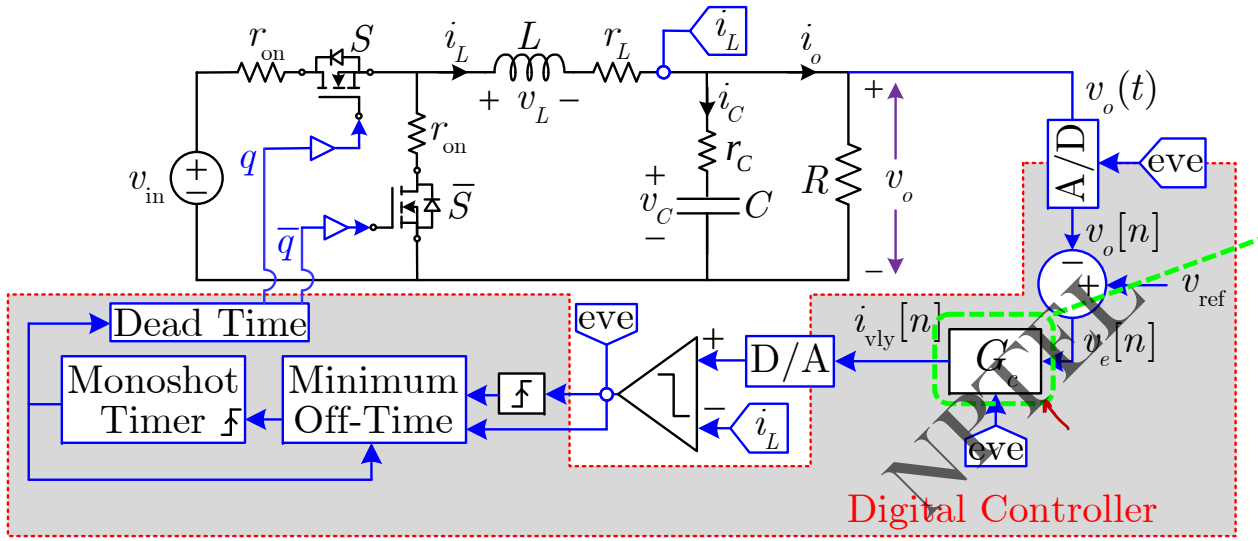


Simulink Block

MATLAB Model for Mixed-Signal Constant-On Time Control (contd..)



Digital Compensator

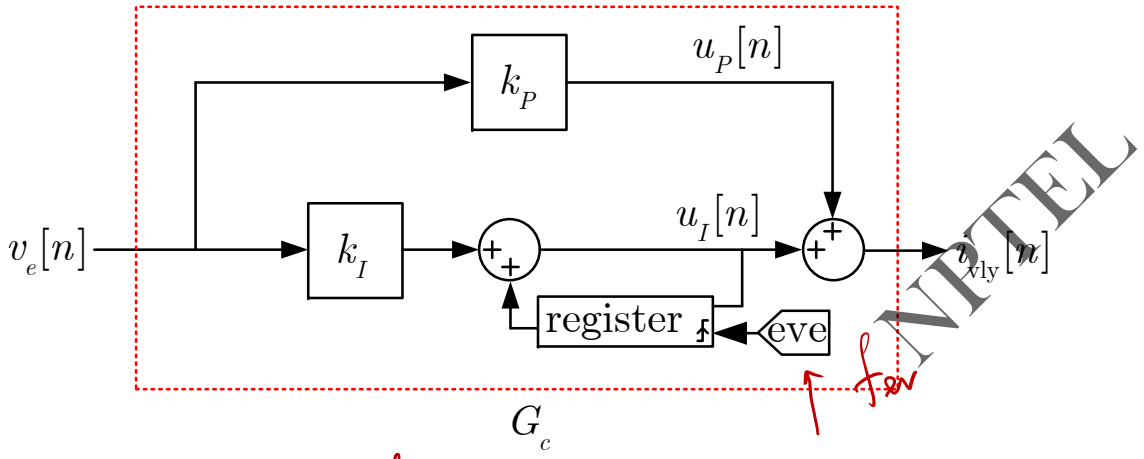


Digital Compensator $G_c(z)$

- P
- PI
- PID

Digital Compensator (contd..)

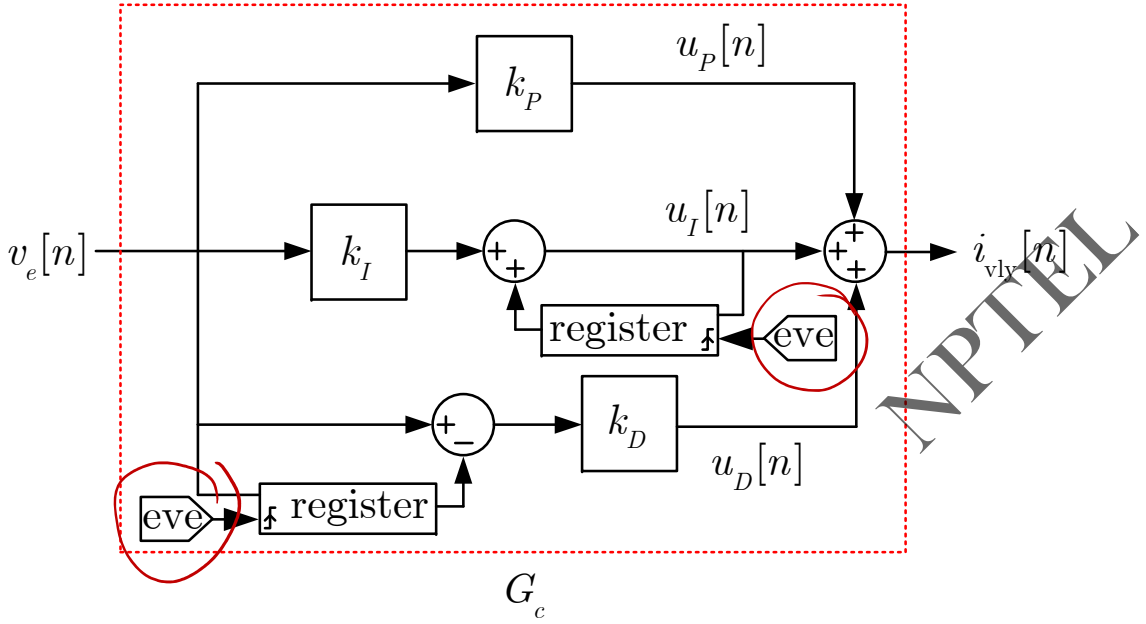
- Proportional-Integral



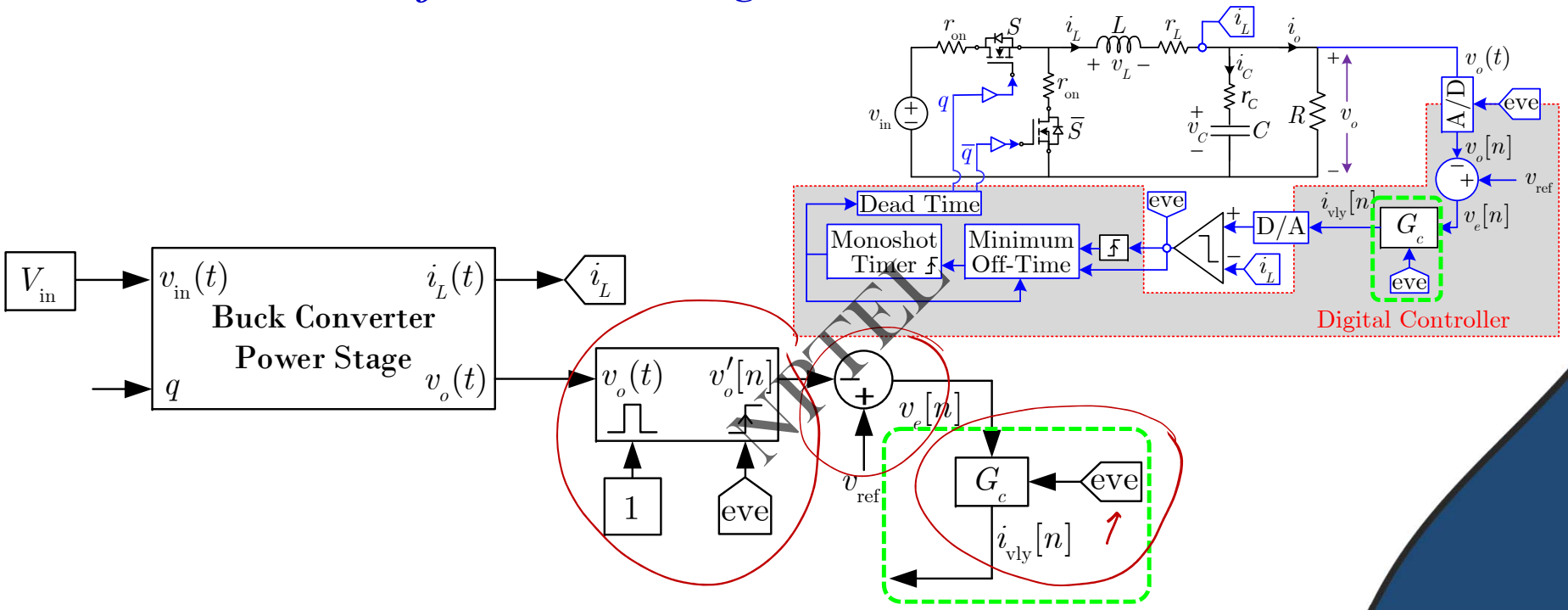
difference equations with clock synchronism

Digital Compensator

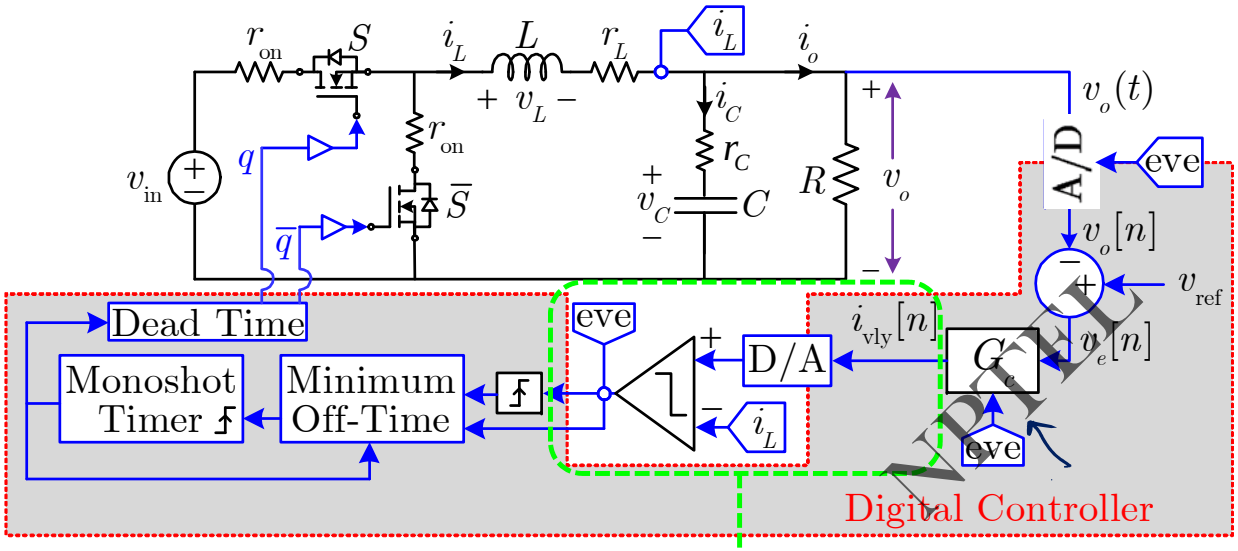
- Proportional-Integral-Derivative

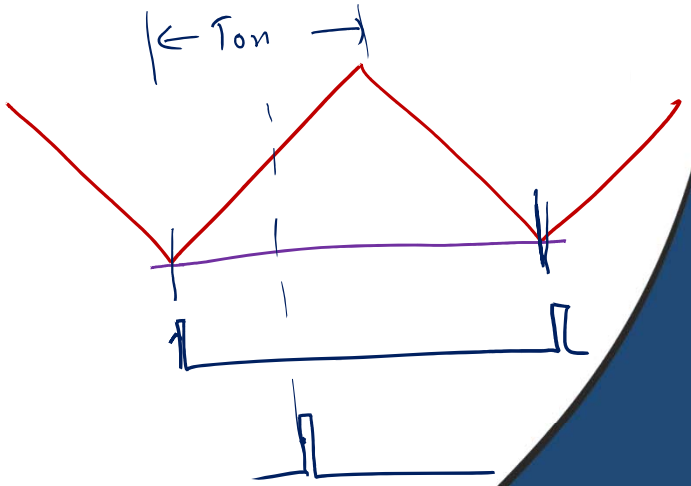


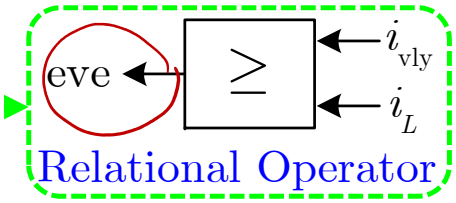
MATLAB Model for Mixed-Signal Constant-On Time Control



Current Comparator

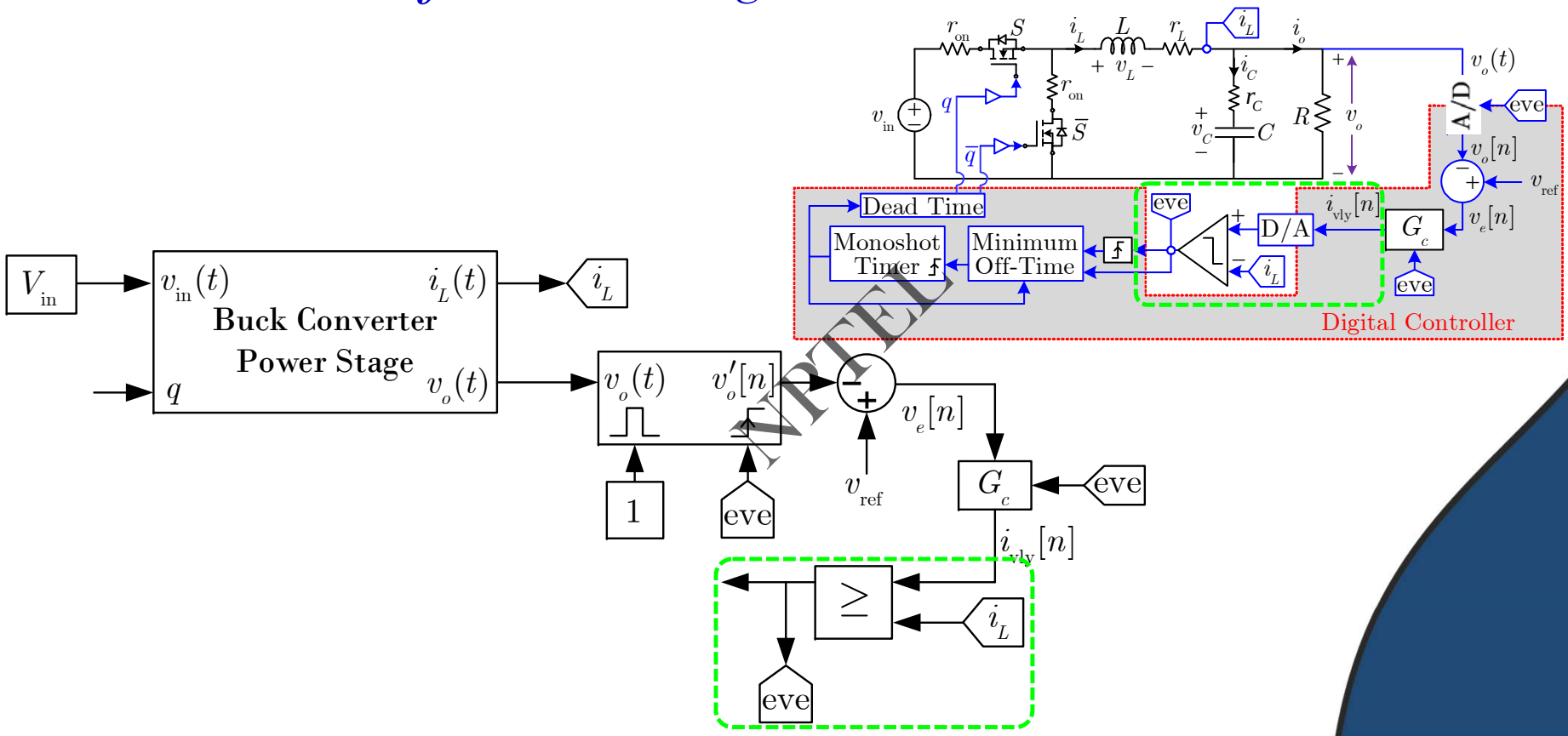




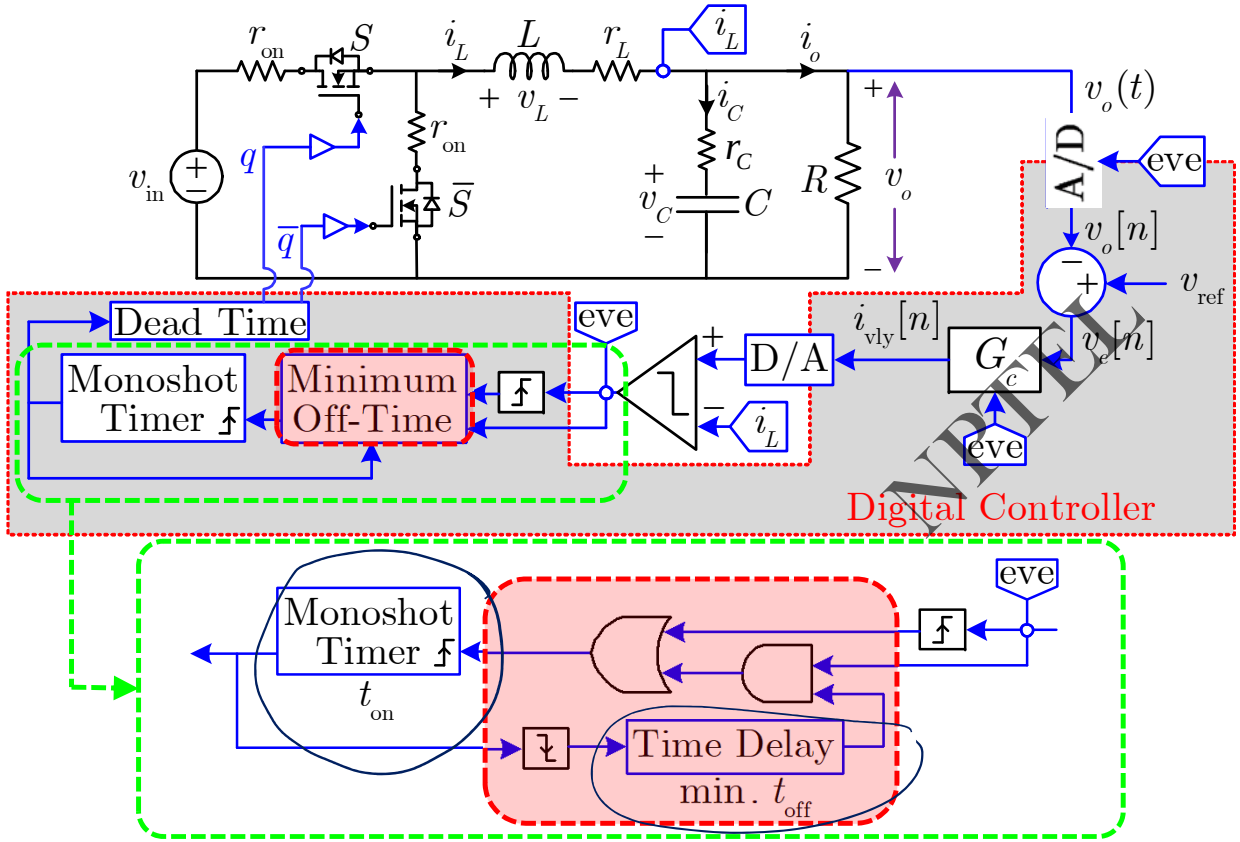


Simulink Block

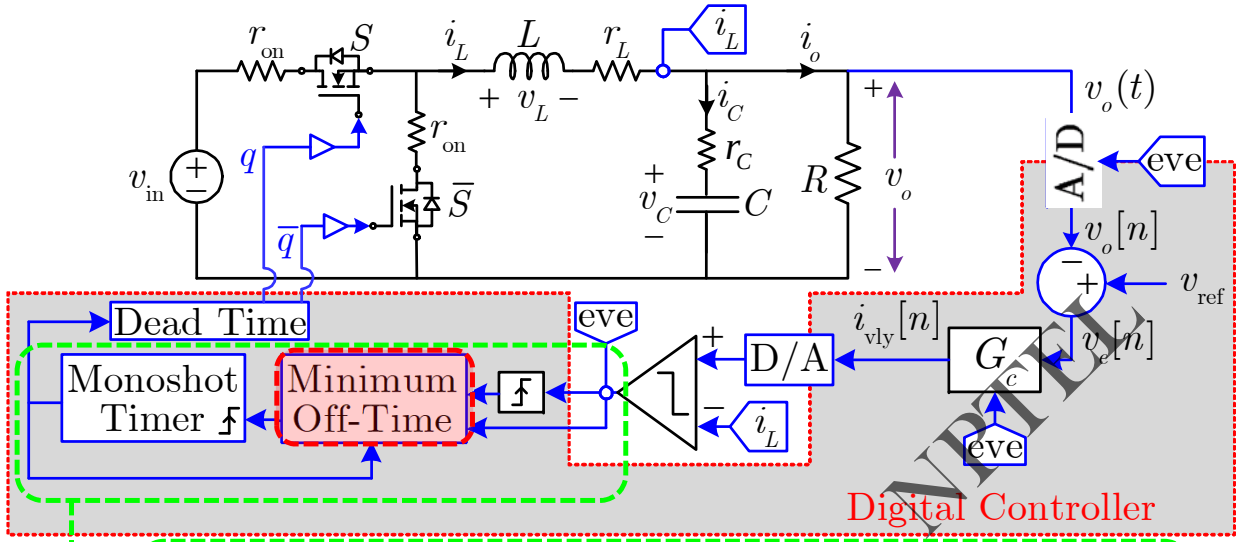
MATLAB Model for Mixed-Signal Constant-On Time Control

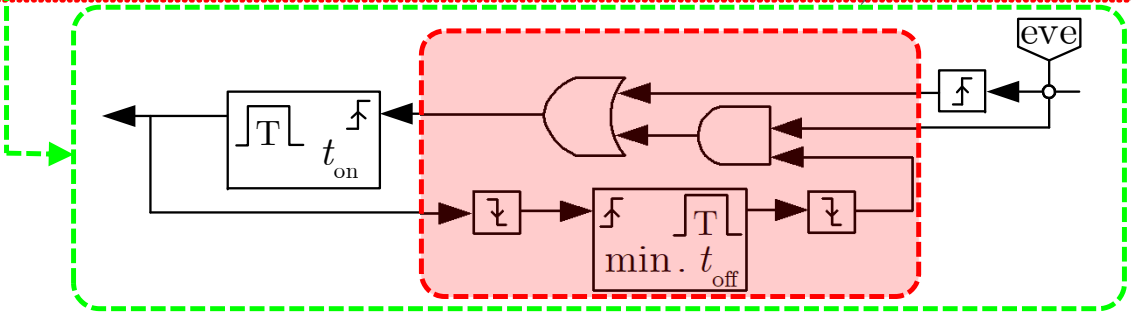


Constant On-Time Modulation with Minimum Off-Time



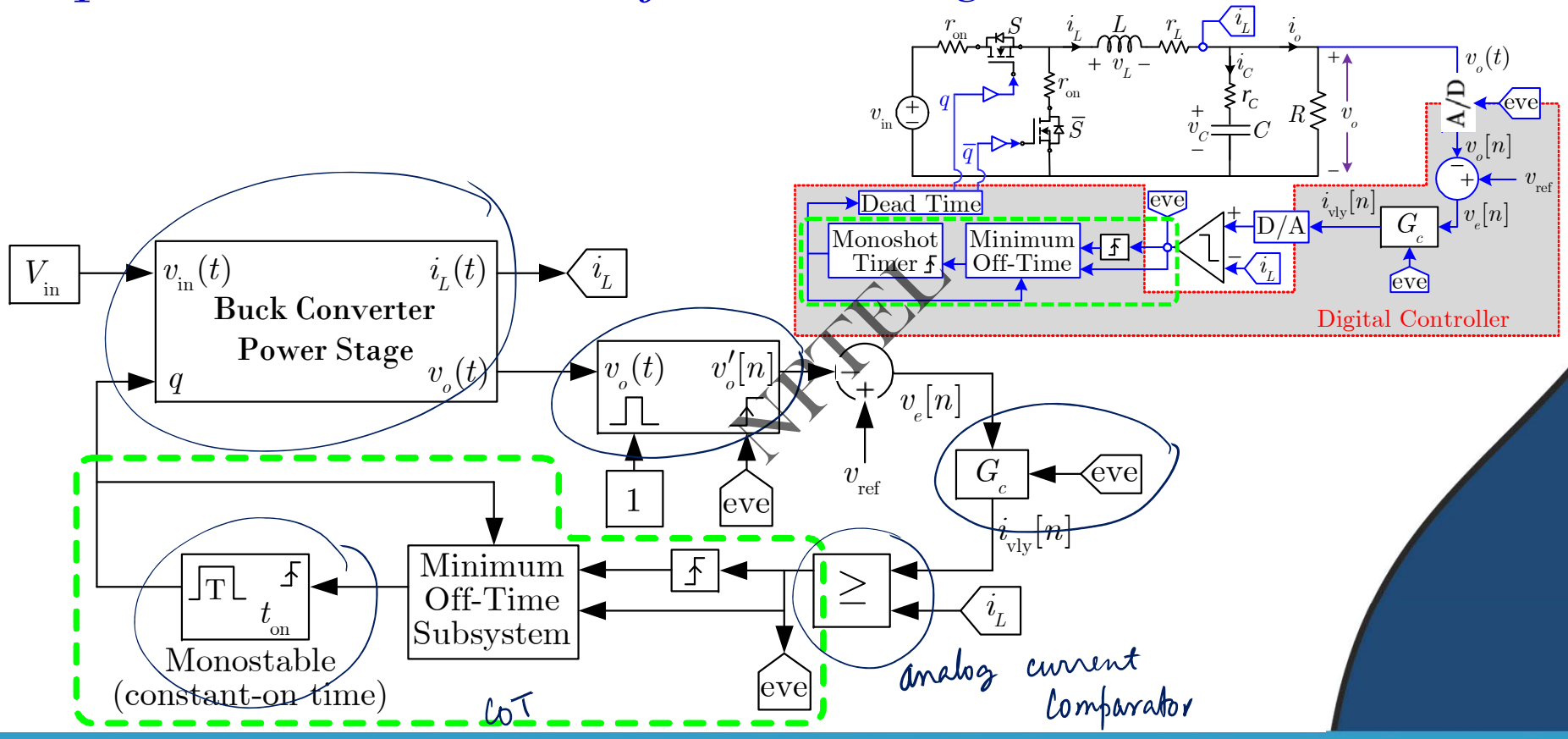
Constant On-Time Modulation with Minimum Off-Time Subsystem





Simulink Subsystem

Complete MATLAB Model for Mixed-Signal Constant-On Time Control



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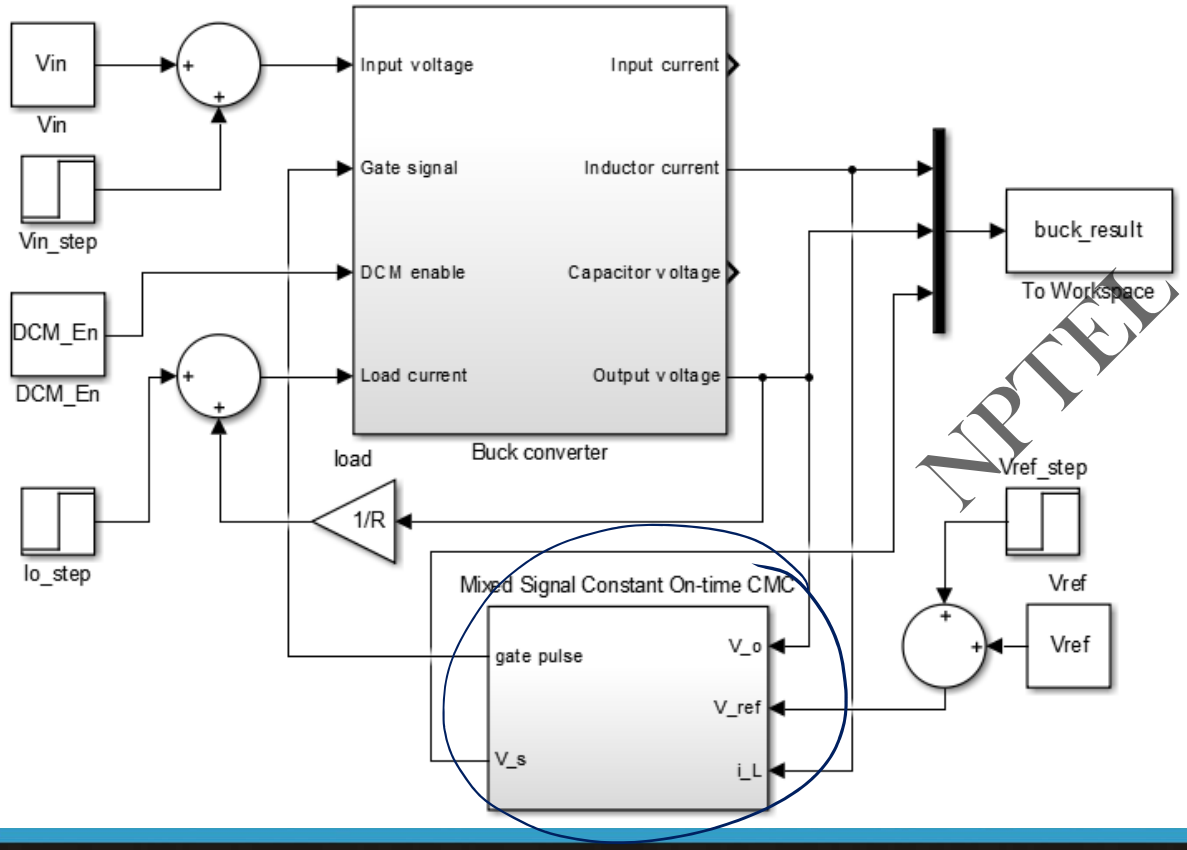

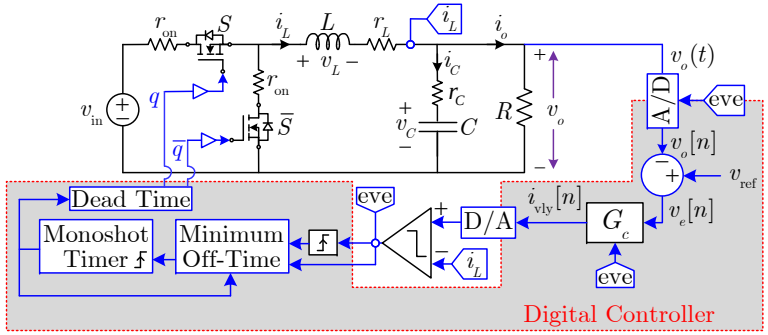

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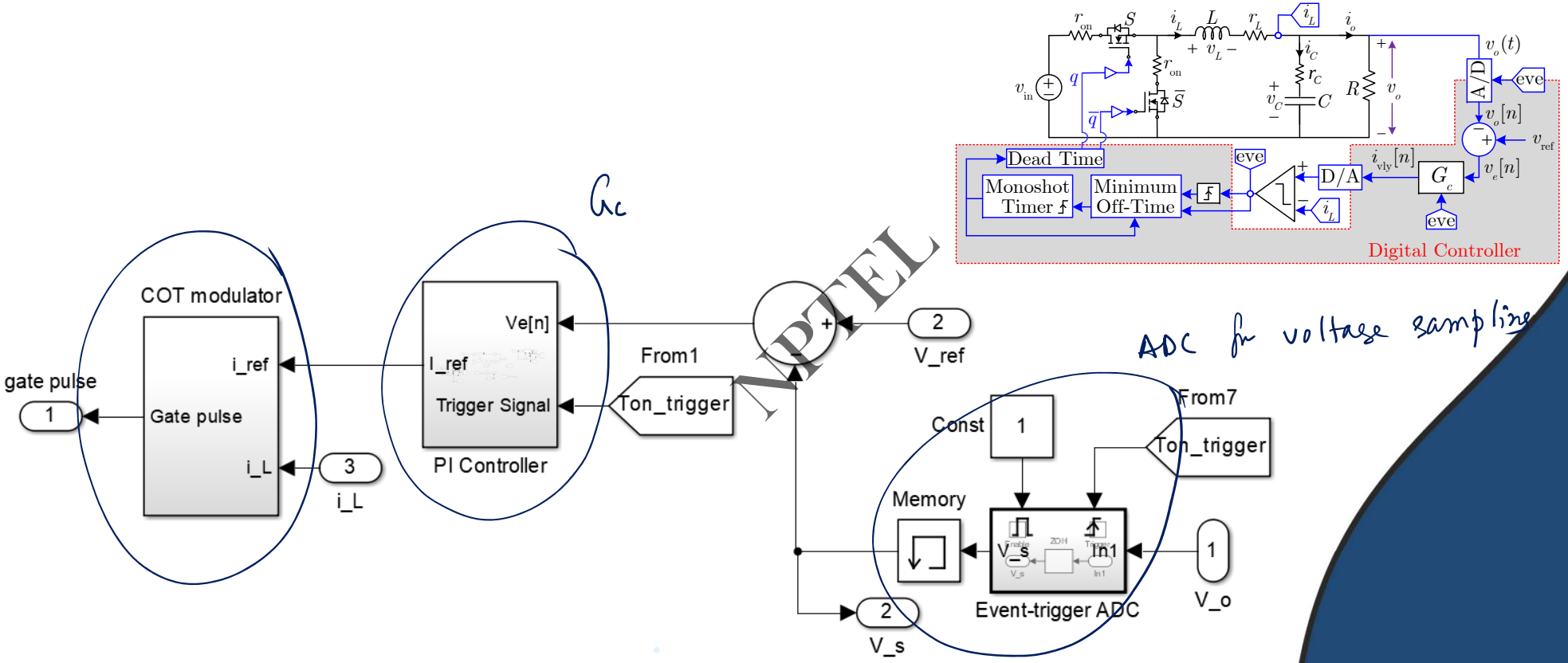
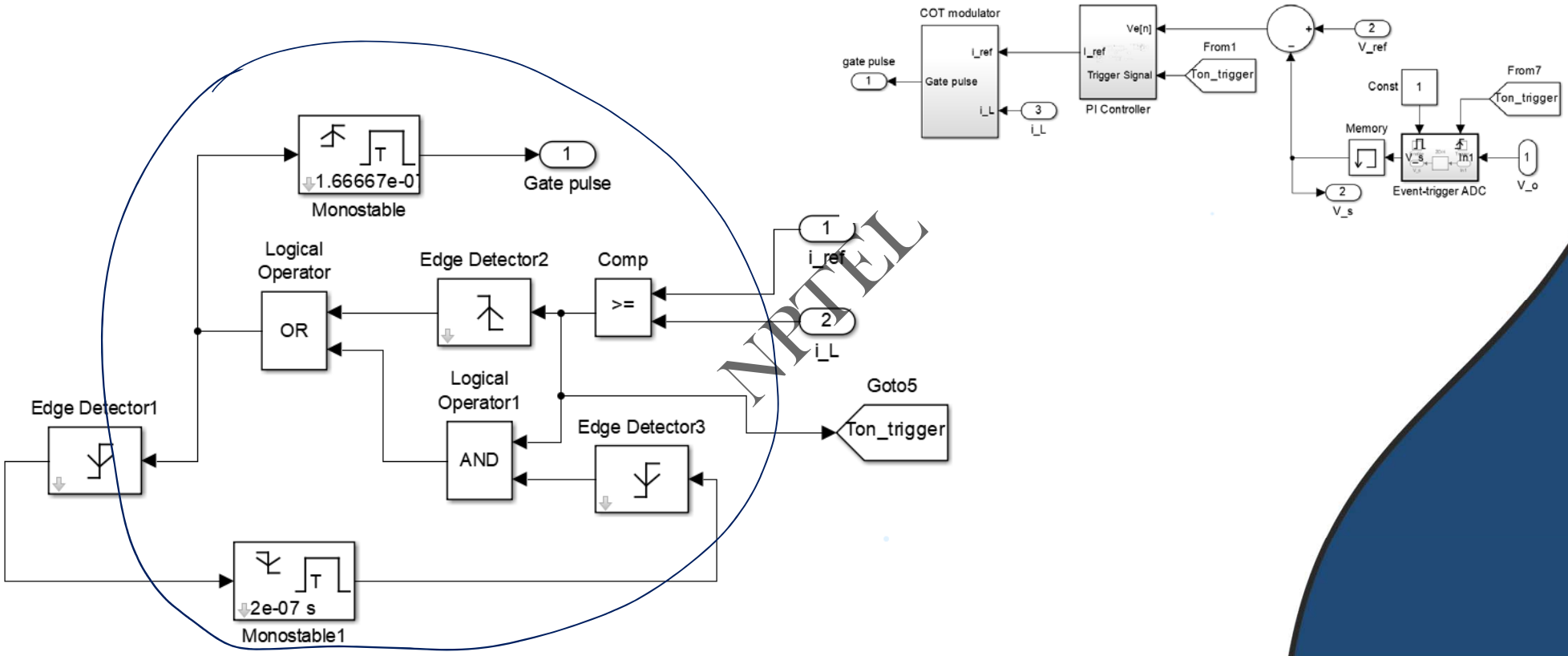
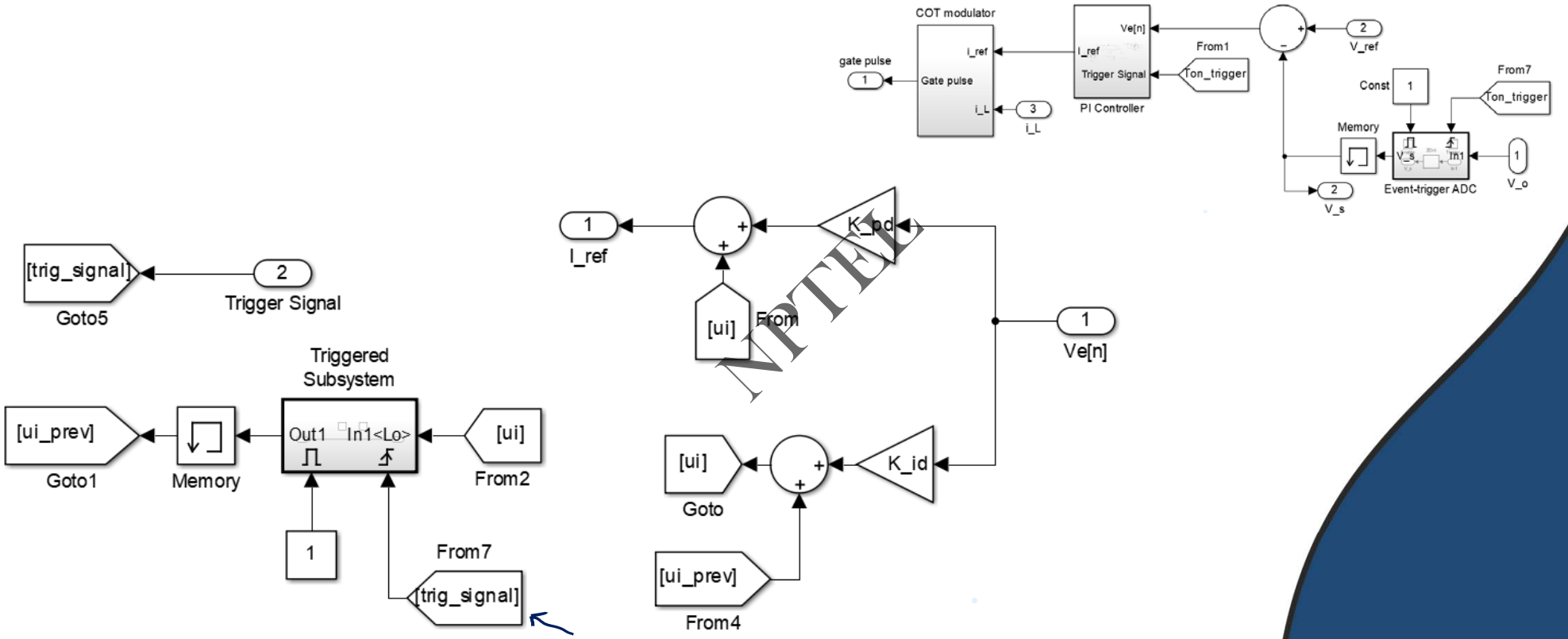


Complete MATLAB Model for Mixed-Signal Constant-On Time Control



Complete MATLAB Model for Mixed-Signal Constant-On Time Control



CONCLUSION

- Custom MATLAB model development for constant on-time mixed-signal CMC
- MATLAB simulation studies

THANK YOU !