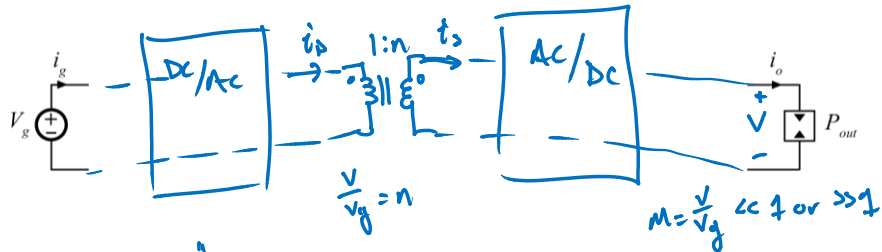




L

Introduction to AC-link topologies



Ideal: "DCX" → DC Transformer

Not possible in physical implementation → substitution

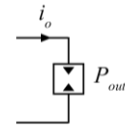
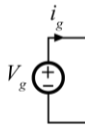
why no DCX good

- Use XF → Provide large "step" at high γ
- Zero switching loss

• $i_p = i_g$ $i_s = i_o$ → current stresses minimized

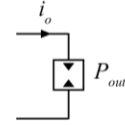
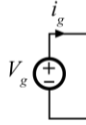


Introduction to AC-link topologies

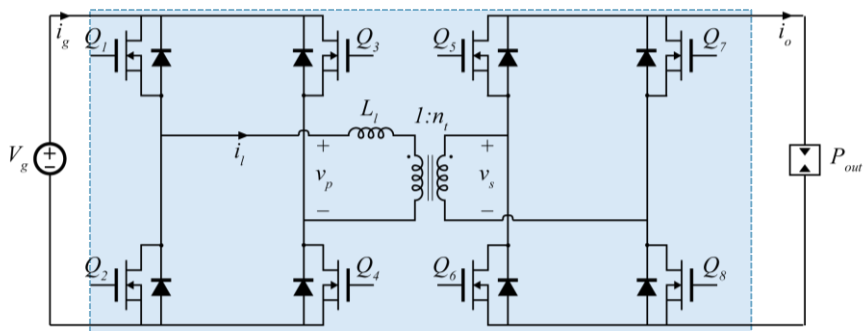




Introduction to AC-link topologies

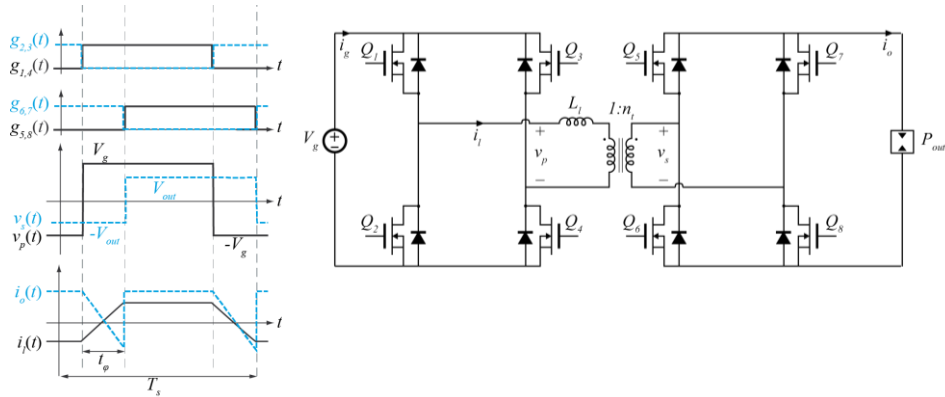


DAB Converter

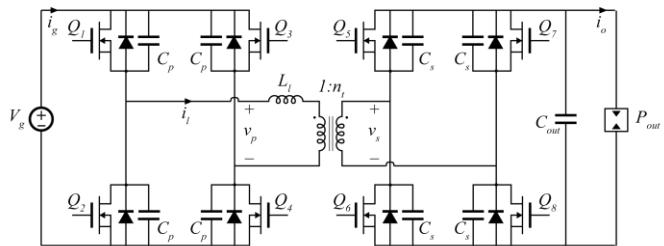




Switching Behavior

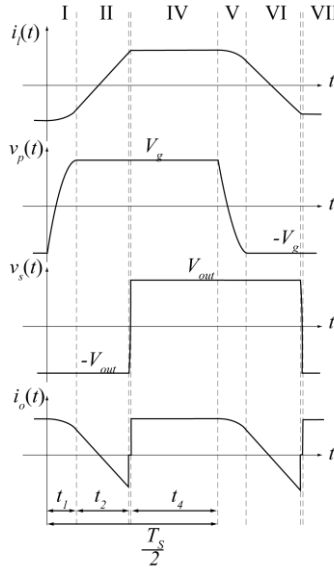


Dual Active Bridge Converter





DAB Operation Analysis



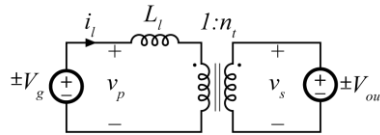
• Phase-shifted DAB has four unique intervals per half-period

- Primary dead time
- Phase shift
- Secondary dead time
- Main power delivery

• Begin by considering DCX operation, where

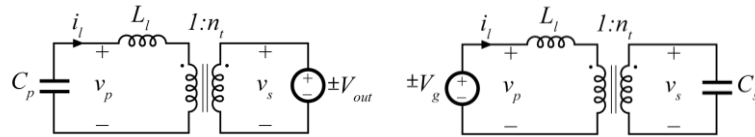
$$V_{out} = n_t V_g$$

• Even-numbered intervals, circuit reduces to

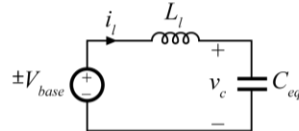


Resonant Interval Analysis

• Resonant intervals have equivalent circuits of the form:



• Both of which can be simplified to:



$$v_c(0) = V_{C0}$$

$$i_l(0) = I_{L0}$$

