Introduction to AC-link topologies

Ideal: "DCX" \rightarrow DC Transformer
Not possible in physical implementation - saturation
why no DCX good
- Use XF \rightarrow Provide large "step" at high ε
- Zero switching loss
  - \( i_p = i_g \), \( t_s = t_o \) \rightarrow current stress minimized
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
  \[ V_{\text{out}} = n_i V_g \]
- Even-numbered intervals, circuit reduces to

Resonant Interval Analysis

- Resonant intervals have equivalent circuits of the form:

- Both of which can be simplified to:

\[ v_r(0) = V_{c0} \]
\[ i_i(0) = I_{L0} \]