

Topology 11: Both Switches ON

Physical State: Maximum energy storage mode. Both phases store energy from AC source. Output bus isolated (D7, D8 reverse biased).

Inductor Equations (6 equations)

$$\begin{aligned}diL1/dt &= V_{in} / L1 \\diL2/dt &= V_{in} / L2 \\diL3/dt &= 0 \\diL4/dt &= 0 \\diL5/dt &= -vC1 / L5 \\diL6/dt &= -vC3 / L6\end{aligned}$$

Capacitor Equations (3 equations)

$$\begin{aligned}dvC1/dt &= (-iL5) / C1 \\dvC3/dt &= (-iL6) / C3 \\dvC0/dt &= -P / (C0 \cdot vC0)\end{aligned}$$

Critical Insight: L1, L2 charge DIRECTLY from V_{in} via diode+switch path to ground (no capacitor voltage in KVL). L5, L6 build REVERSE current ($iL5 < 0$, $iL6 < 0$) through series loops with C1, C3. Output capacitor discharges to CPL load only.

Physical Meaning: Direct charging paths for input inductors. Reverse current build-up in output inductors creates magnetic energy that will be released forward when switches open. Output isolated - no power transfer during this topology.