Time-Domain Analysis of Switching Transitions

Resonant Circuit Solution
Normalization and Notation

\[ v_L(t) = V_{dc} + (V_0 - V_{dc}) \cos \left( \frac{t}{\sqrt{LC}} \right) + (I_0 - I_{dc}) \sqrt{\frac{L}{C}} \sin \left( \frac{t}{\sqrt{LC}} \right) \]

\[ i_L(t) = I_{dc} + (I_0 - I_{dc}) \cos \left( \frac{t}{\sqrt{LC}} \right) + (V_{dc} - V_0) \sqrt{\frac{C}{L}} \sin \left( \frac{t}{\sqrt{LC}} \right) \]
State Plane Analysis

