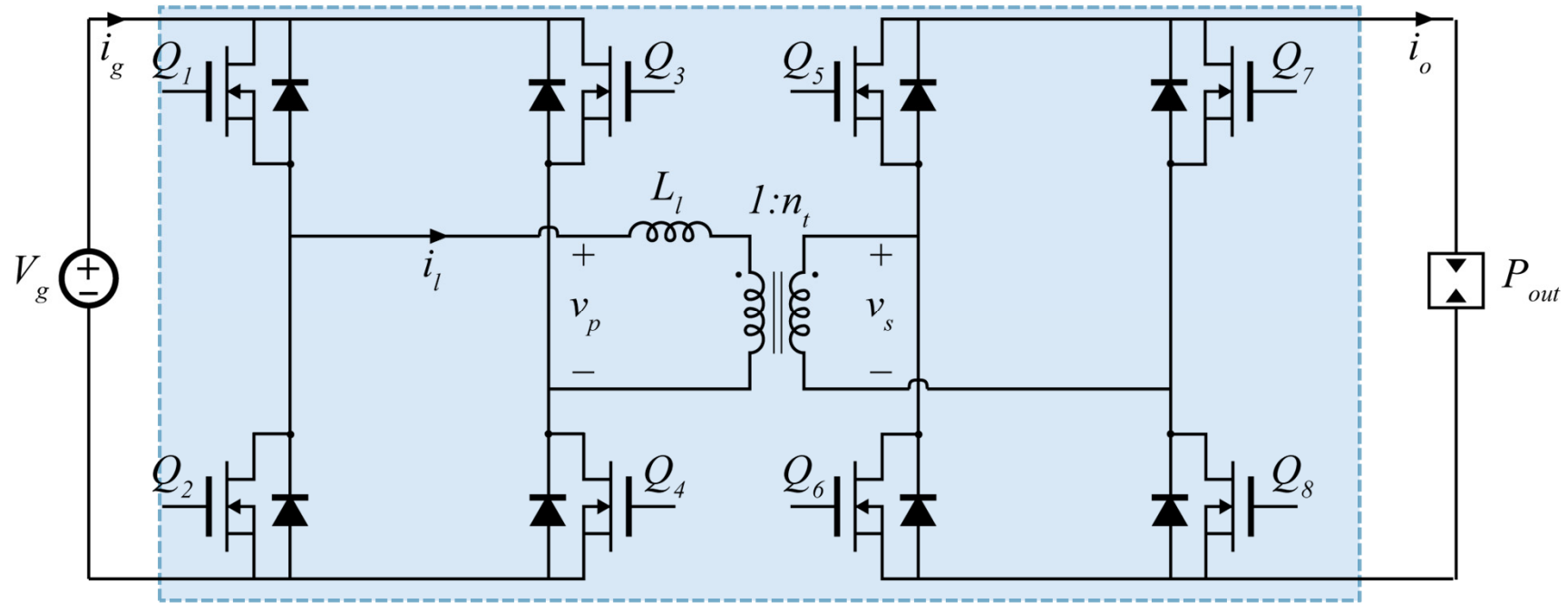
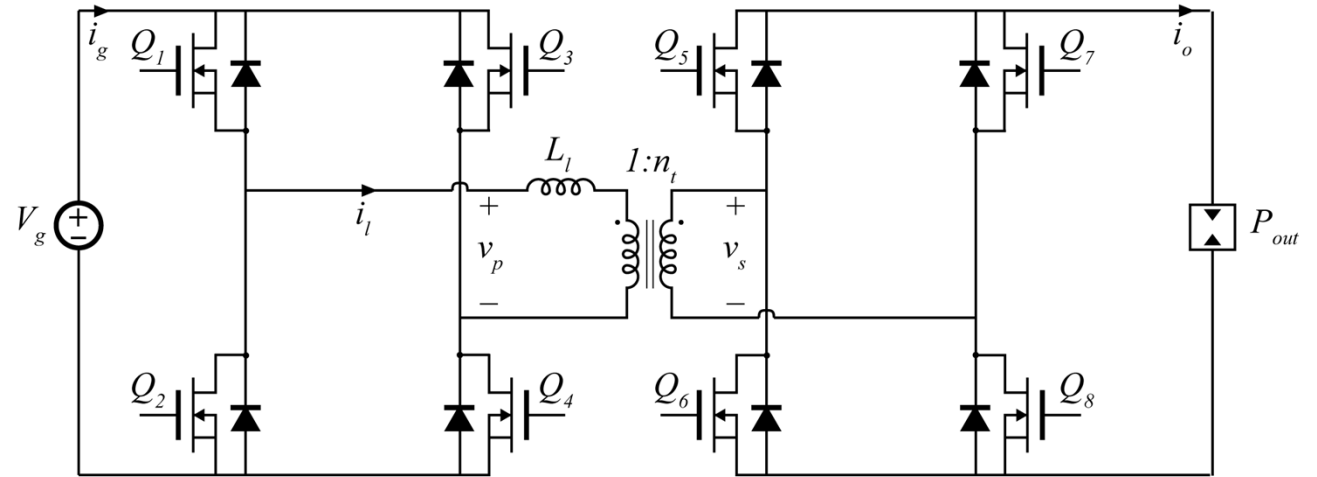
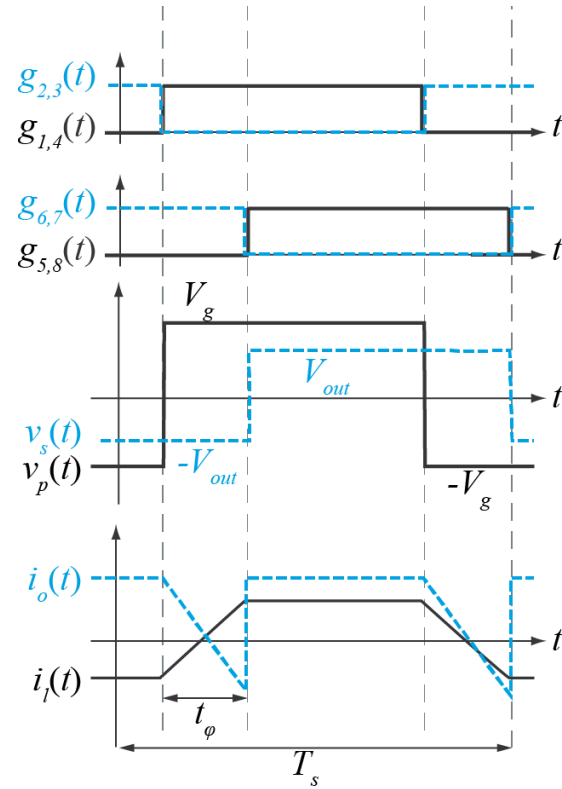


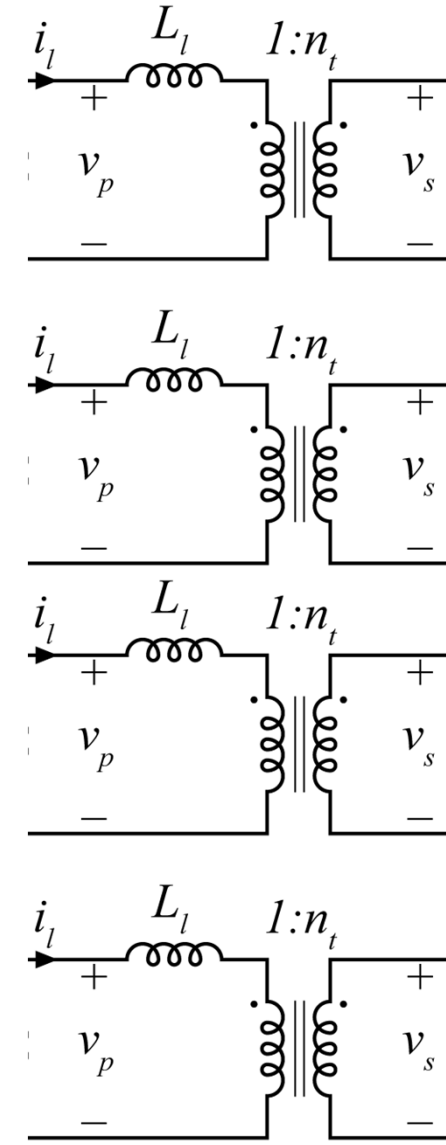
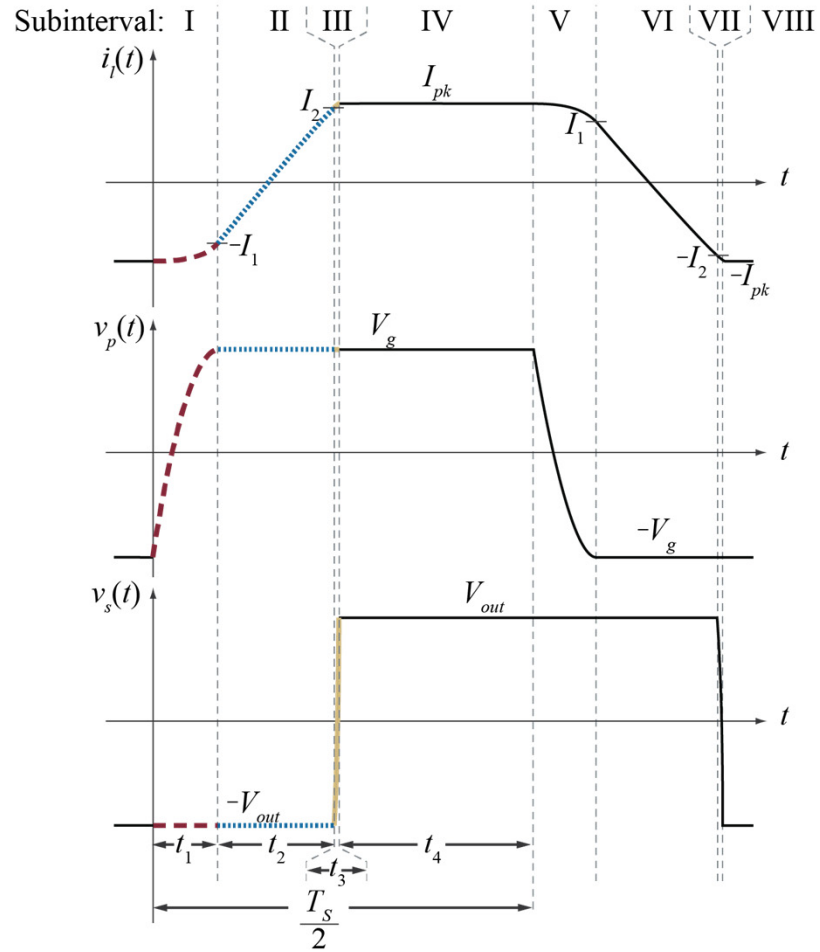
Dual Active Bridge



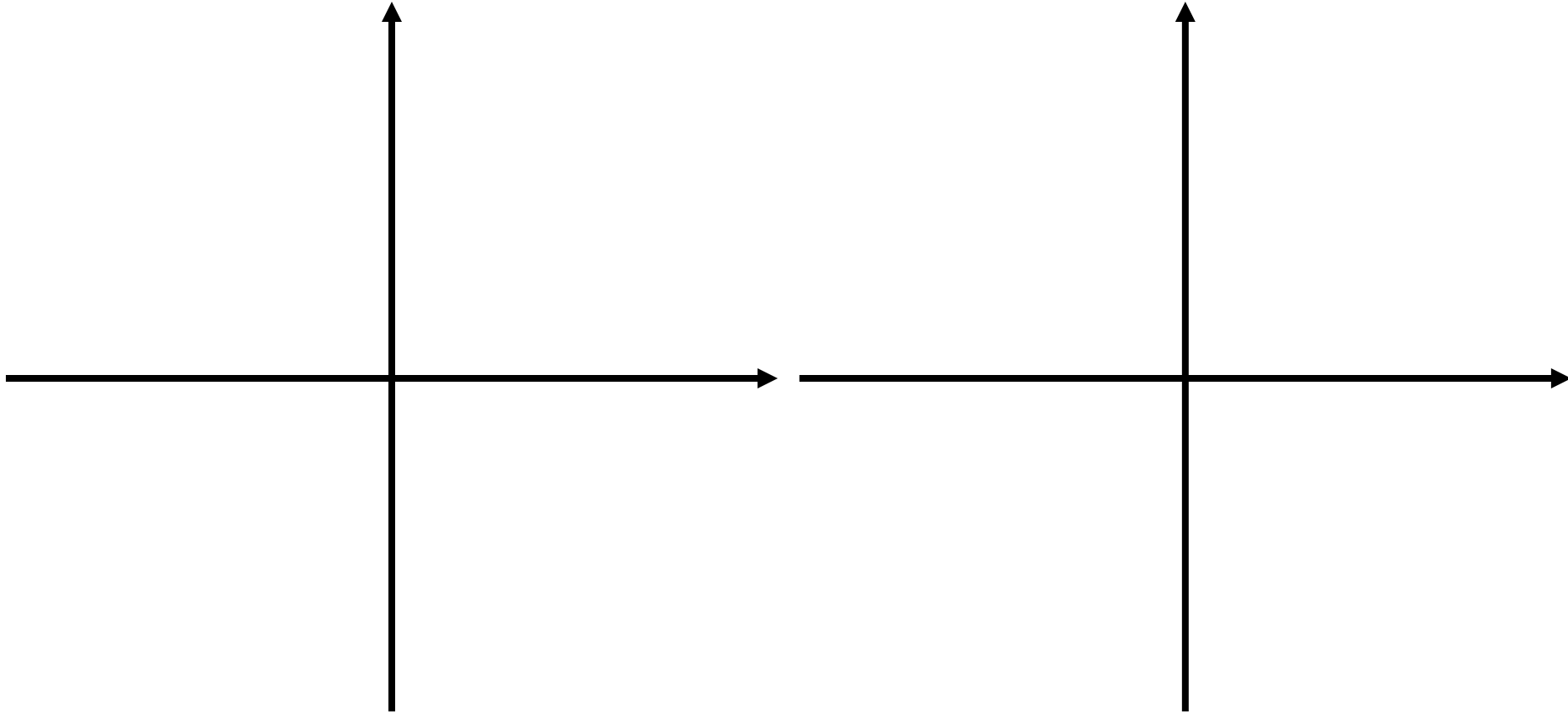
Switching Behavior (PSM)



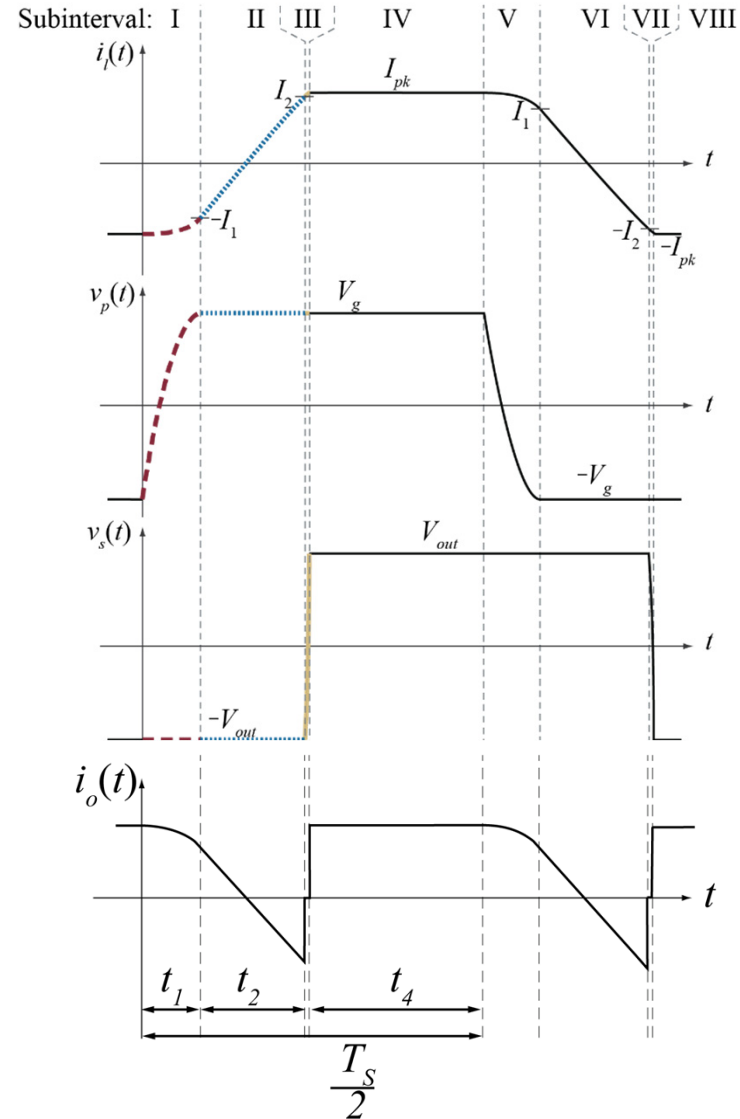
DAB Operation Analysis



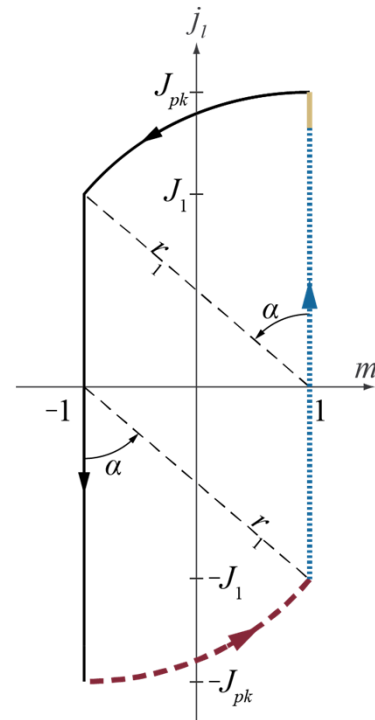
DAB State Plane



State Plane Analysis of DAB Converter

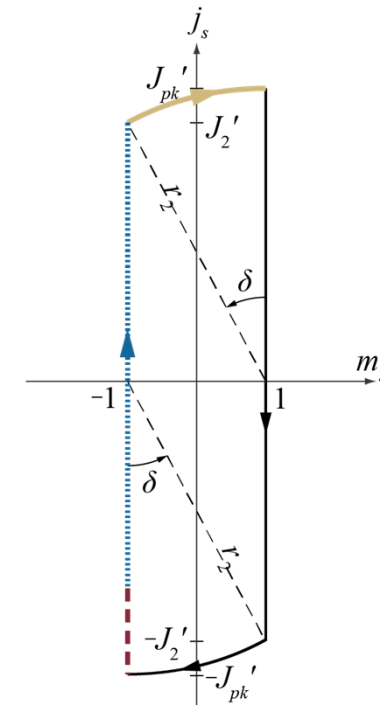


Primary



$$I_{base} = V_g \sqrt{\frac{C_p}{L_l}}$$

Secondary

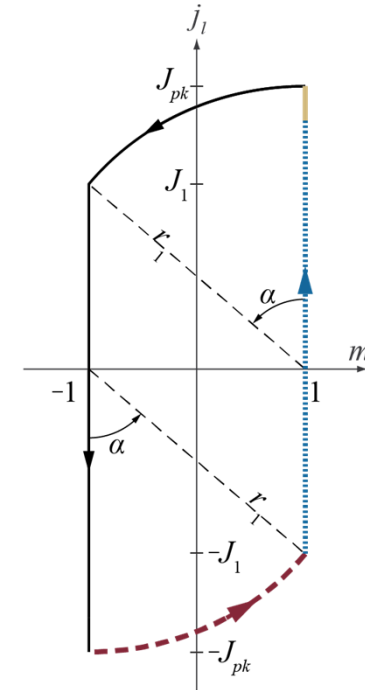


$$I'_{base} = V_g \sqrt{\frac{C_s}{n_t^2 L_l}}$$

ZVS Condition

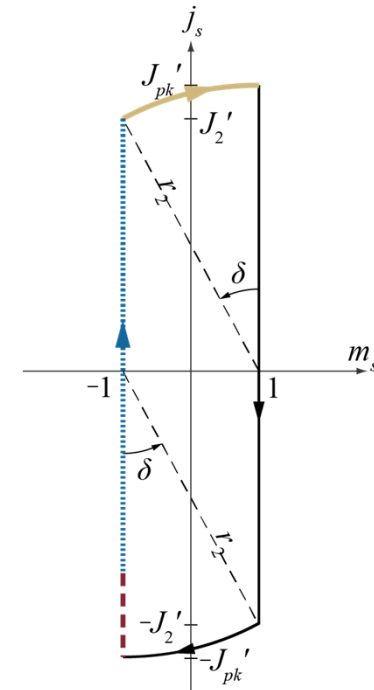
State Plane Solution

Primary



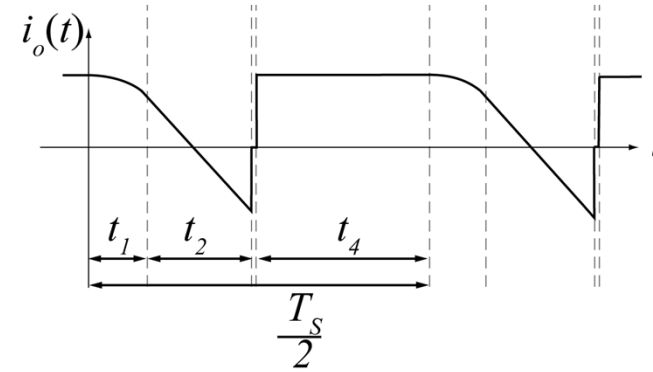
$$I_{base} = V_g \sqrt{\frac{C_p}{L_l}}$$

Secondary



$$I'_{base} = V_g \sqrt{\frac{C_s}{n_t^2 L_l}}$$

Averaging Step



Output Plane

$$J = \frac{n \langle i_{out} \rangle}{I_{base}} = \frac{F}{\pi} \left[2 + \frac{1}{4} (J_1^2 - J_2^2) + J_p \left(\frac{\pi}{F} - \alpha - \beta - \delta \right) \right]$$

