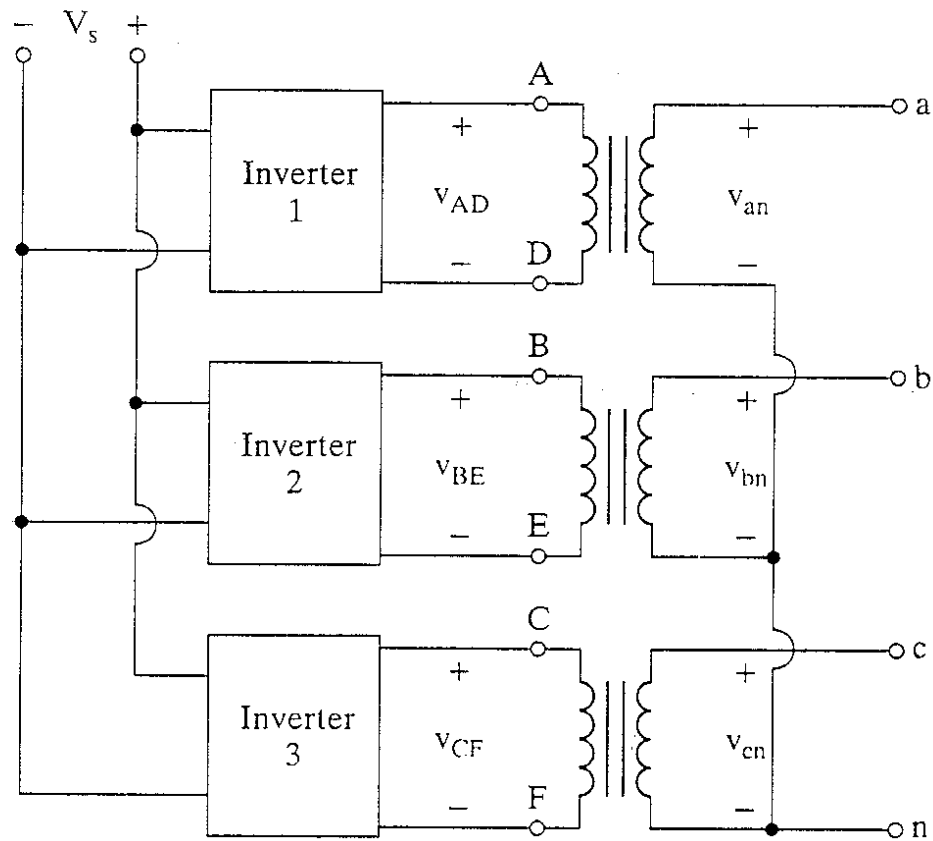


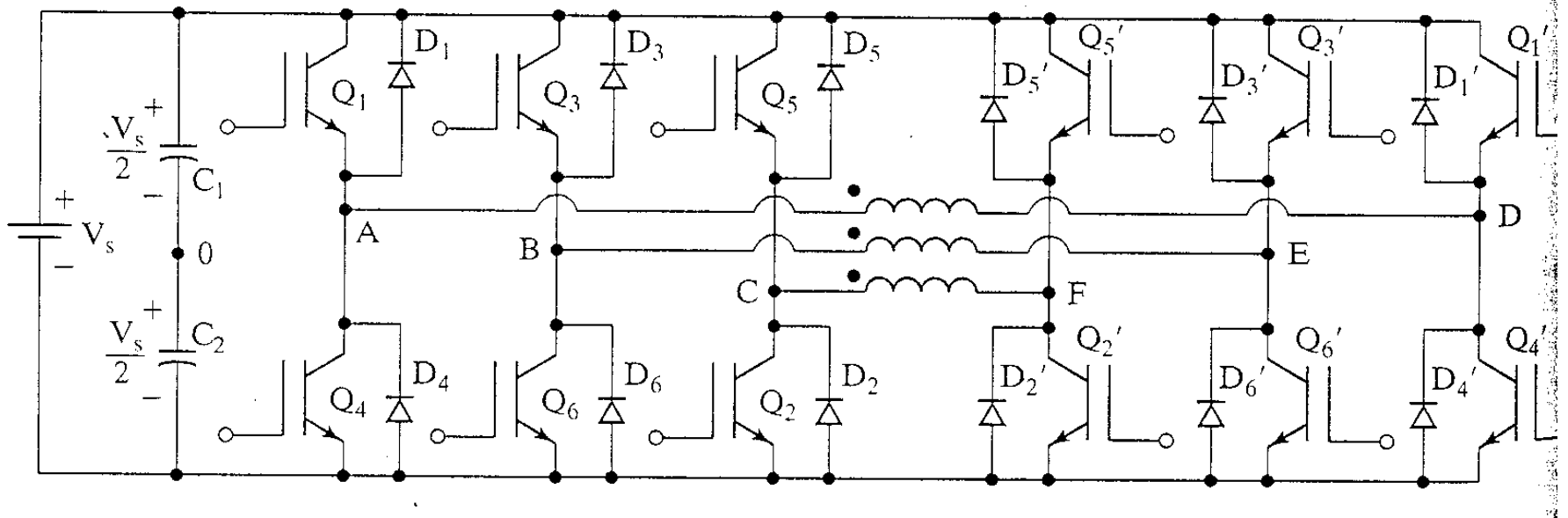
Three-Phase Inverters

Consider three single-phase inverters in parallel, driven 120° apart.



Three-Phase Inverter (continued)

Three single-phase full bridge inverters



12 transistors, 12 diodes, 3 transformers

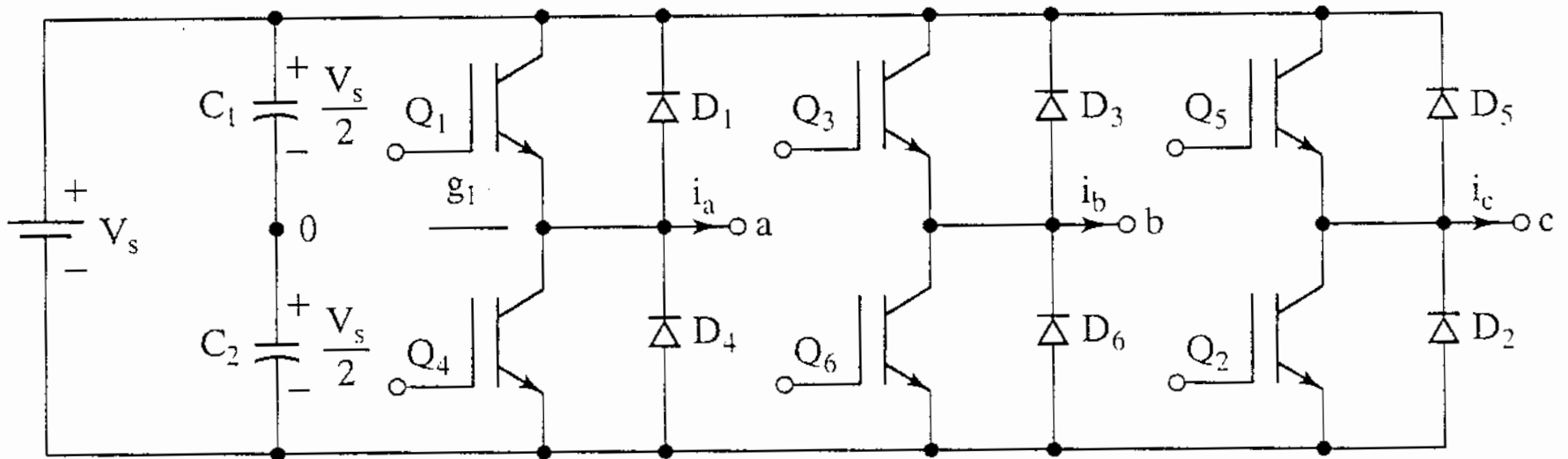
Could it be simpler?

Alternative (Preferred) Configuration

6 transistors, 6 diodes

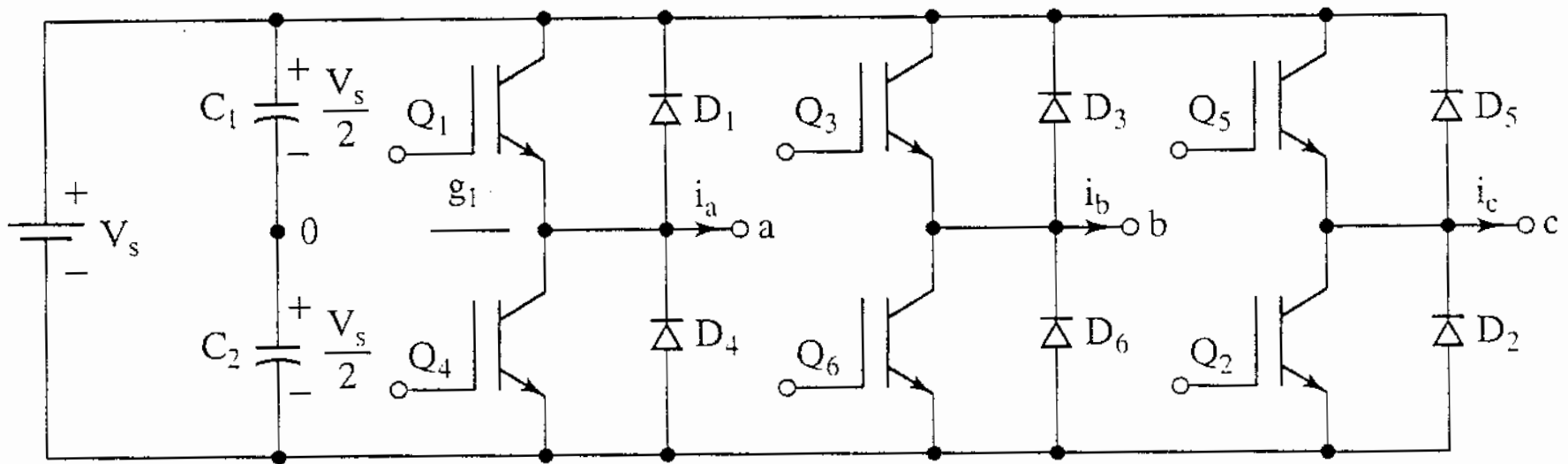
conduction

for 120° or 180°



180° Conduction

- Three transistors ON at a time

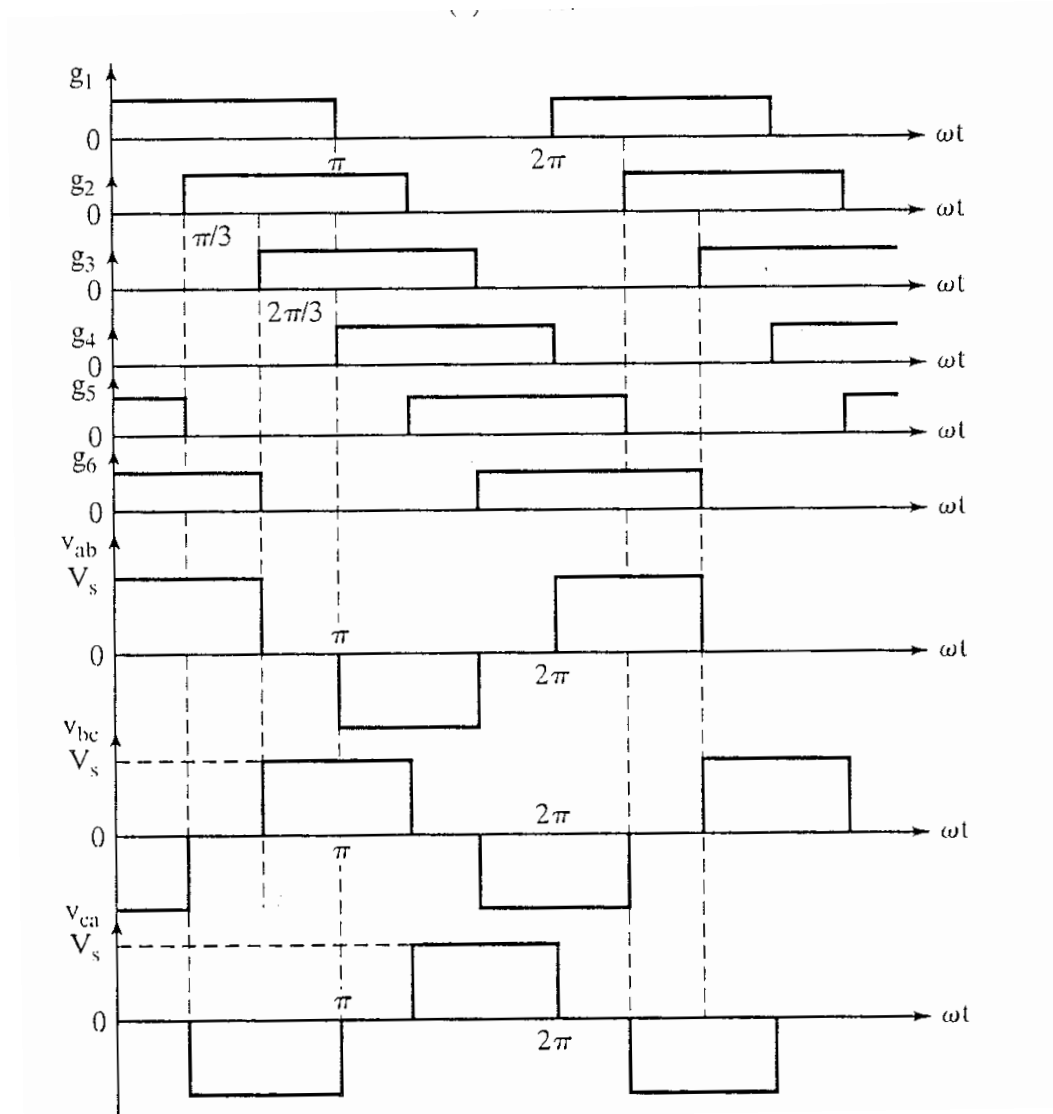


Summary Table

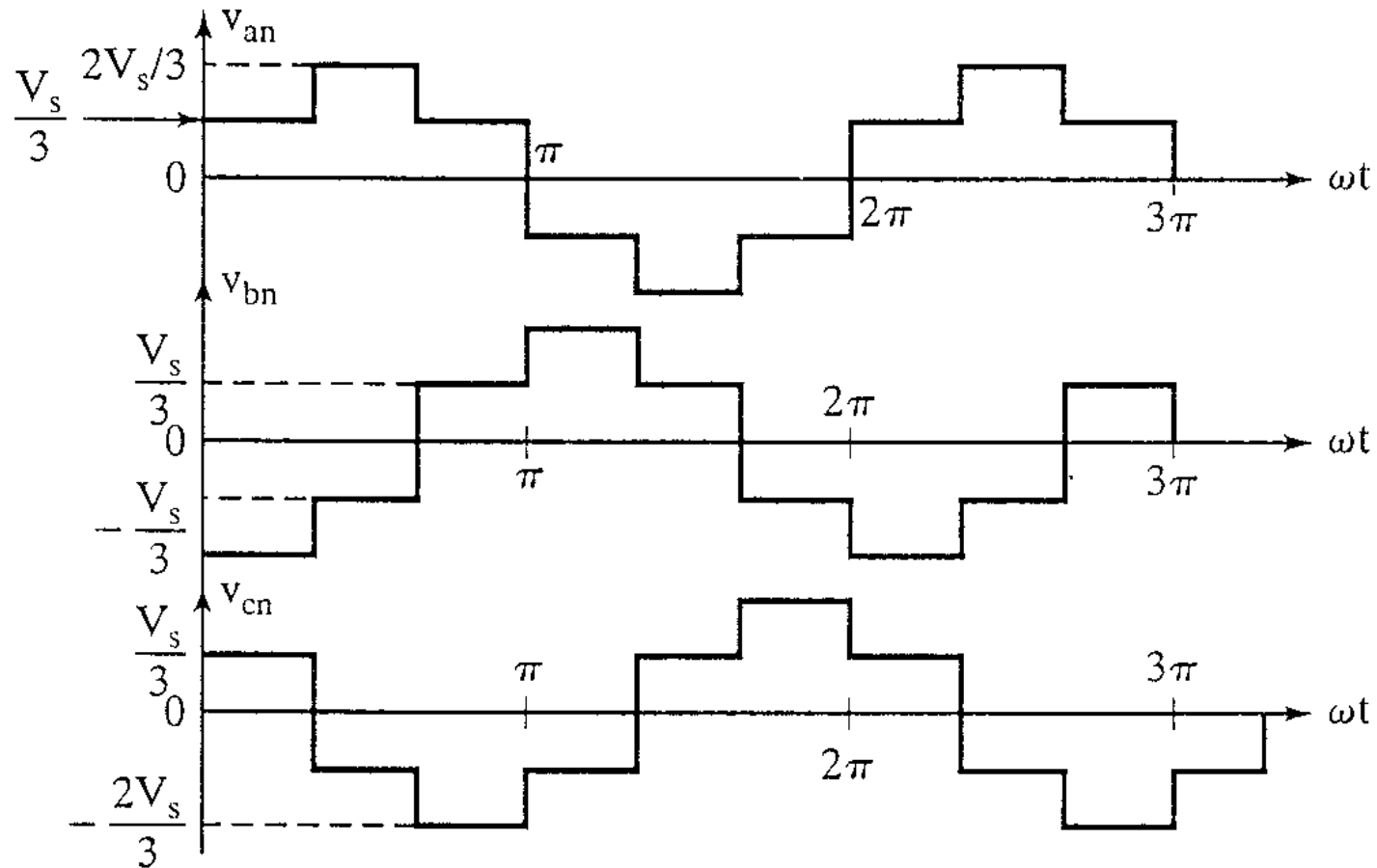
TABLE 6.2 Switch States for Three-Phase Voltage-Source Inverter (VSI)

State	State No.	Switch States	v_{ab}	v_{bc}	v_{ca}
$S_1, S_2,$ and S_6 are on and $S_4, S_5,$ and S_3 are off	1	100	V_S	0	$-V_S$
$S_2, S_3,$ and S_1 are on and $S_5, S_6,$ and S_4 are off	2	110	0	V_S	$-V_S$
$S_3, S_4,$ and S_2 are on and $S_6, S_1,$ and S_5 are off	3	010	$-V_S$	V_S	0
$S_4, S_5,$ and S_3 are on and $S_1, S_2,$ and S_6 are off	4	011	$-V_S$	0	V_S
$S_5, S_6,$ and S_4 are on and $S_2, S_3,$ and S_1 are off	5	001	0	$-V_S$	V_S
$S_6, S_1,$ and S_5 are on and $S_3, S_4,$ and S_2 are off	6	101	V_S	$-V_S$	0
$S_1, S_3,$ and S_5 are on and $S_4, S_6,$ and S_2 are off	7	111	0	0	0
$S_4, S_6,$ and S_2 are on and $S_1, S_3,$ and S_5 are off	8	000	0	0	0

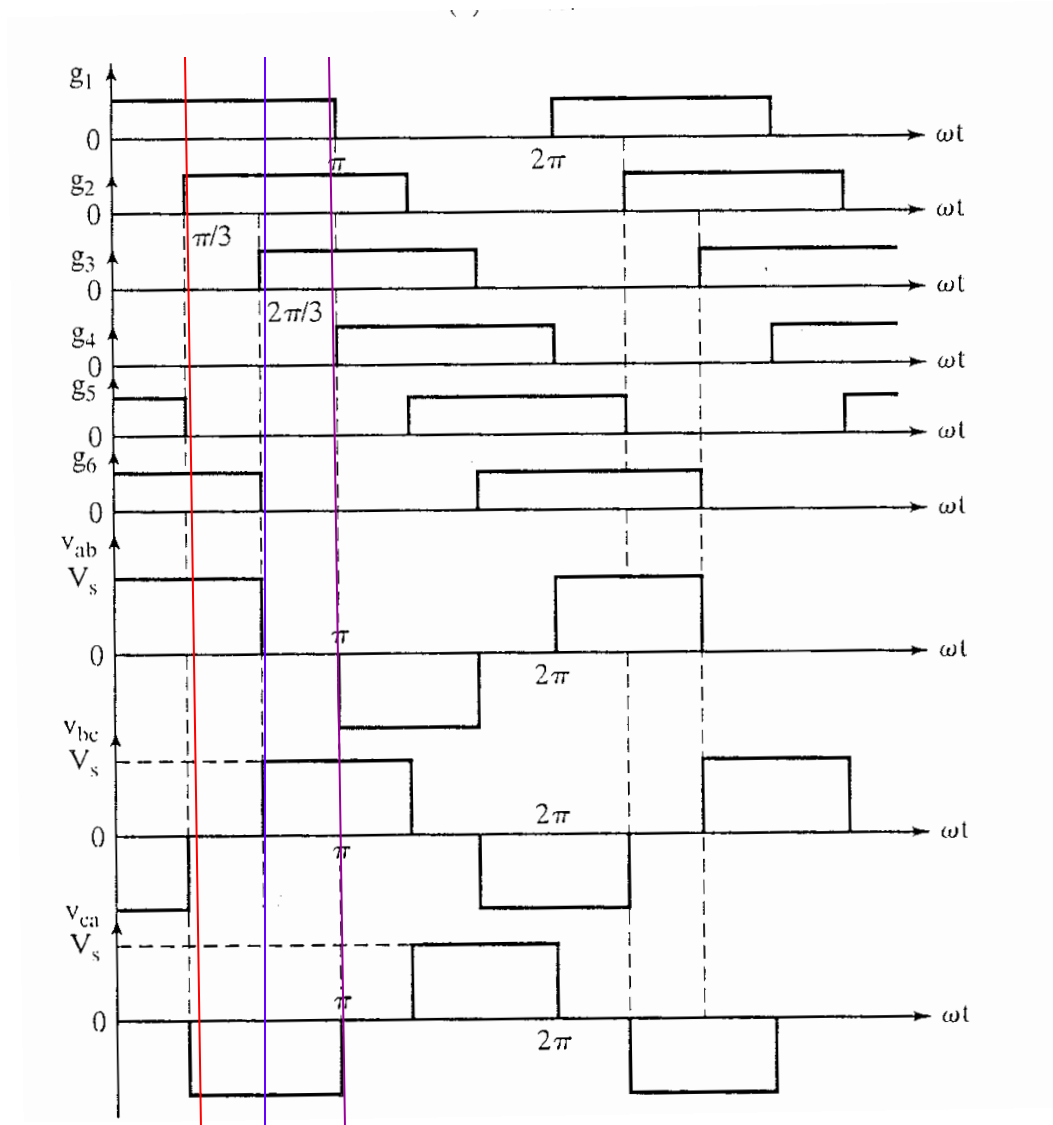
Waveforms for 180° Conduction



Phase Voltages for 180° Conduction



Waveforms for 180° Conduction



Summary Table

TABLE 6.2 Switch States for Three-Phase Voltage-Source Inverter (VSI)

State	State No.	Switch States	v_{ab}	v_{bc}	v_{ca}
$S_1, S_2,$ and S_6 are on and $S_4, S_5,$ and S_3 are off	1	100	V_S	0	$-V_S$
$S_2, S_3,$ and S_1 are on and $S_5, S_6,$ and S_4 are off	2	110	0	V_S	$-V_S$
$S_3, S_4,$ and S_2 are on and $S_6, S_1,$ and S_5 are off	3	010	$-V_S$	V_S	0
$S_4, S_5,$ and S_3 are on and $S_1, S_2,$ and S_6 are off	4	011	$-V_S$	0	V_S
$S_5, S_6,$ and S_4 are on and $S_2, S_3,$ and S_1 are off	5	001	0	$-V_S$	V_S
$S_6, S_1,$ and S_5 are on and $S_3, S_4,$ and S_2 are off	6	101	V_S	$-V_S$	0
$S_1, S_3,$ and S_5 are on and $S_4, S_6,$ and S_2 are off	7	111	0	0	0
$S_4, S_6,$ and S_2 are on and $S_1, S_3,$ and S_5 are off	8	000	0	0	0

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- <http://nptel.ac.in/courses/108108035/2>