Three Phase Inverter

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THREE PHASE BRIDGE INVERTERS

For providing power to industrial applications, three phase inverters are more common than single-phase inverters.

A Basic three phase inverter is a six step inverter. It uses a minimum of six thyristors. In inverter terminology, a step is defined as a change in the firing from one thyristor to the next thyristor in proper sequence.

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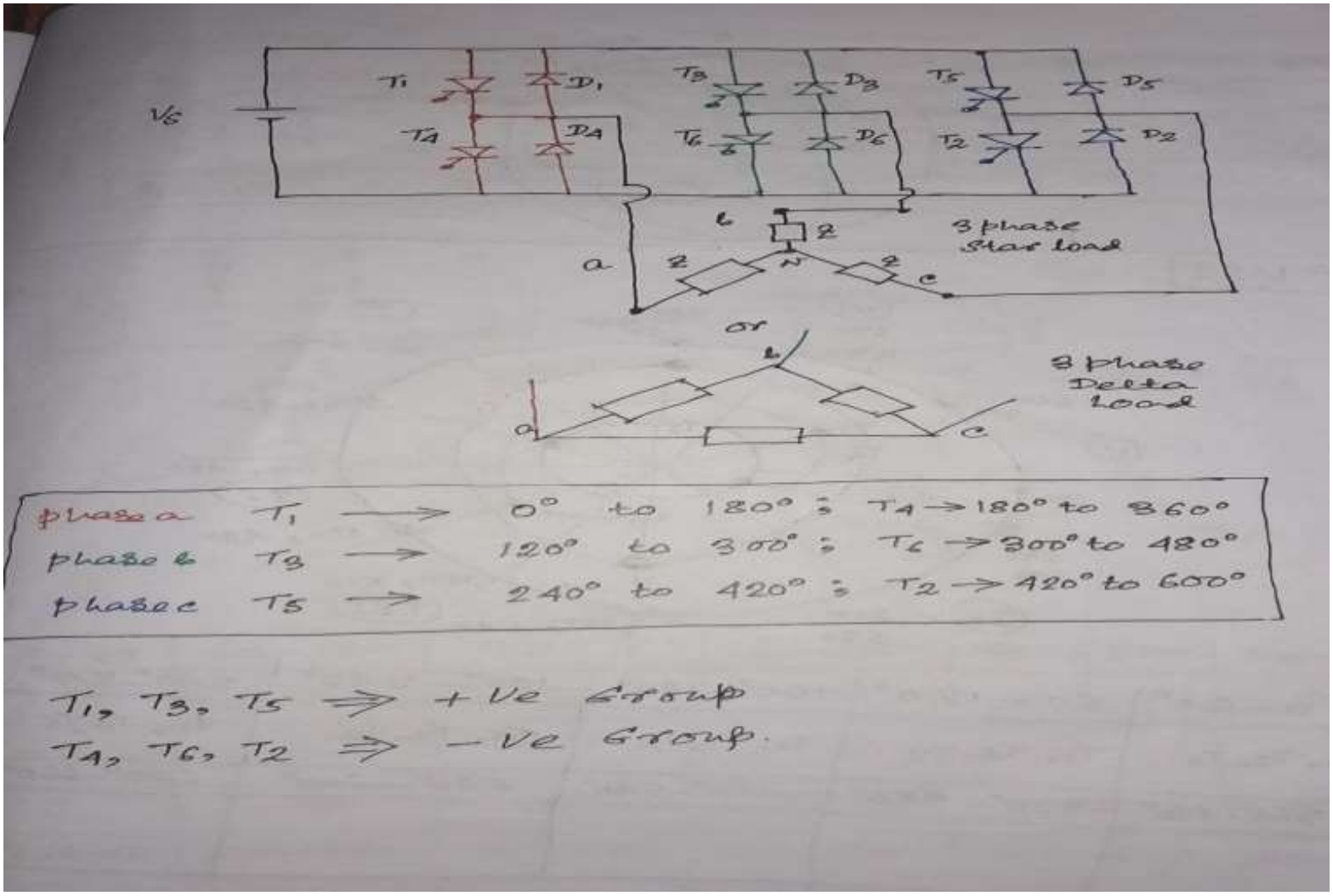
For one cycle of 360°, each step would be of 60° interval for a six-step inverter. This means that thyristors would be gated at regular intervals of 60° in proper sequence so that a 3 phase ac voltage is synthesized at the o/p terminals of a six step inverter.

In low or medium power applications IGBT can be used in place of Thyristor.

- Two Schemes
  - : 180° VSI – Each thyristor conducts for 180°
  - : 120° VSI – Each thyristor conducts for 120°

Three Phase Inverter



phase a	T_1	⟶	0° to 180° ;	T_A ⟶ 180° to 360°
phase b	T_3	⟶	120° to 300° ;	T_C ⟶ 300° to 480°
phase c	T_5	⟶	240° to 420° ;	T_2 ⟶ 420° to 600°

$T_1, T_3, T_5 \Rightarrow$ +ve Group

$T_A, T_C, T_2 \Rightarrow$ −ve Group.

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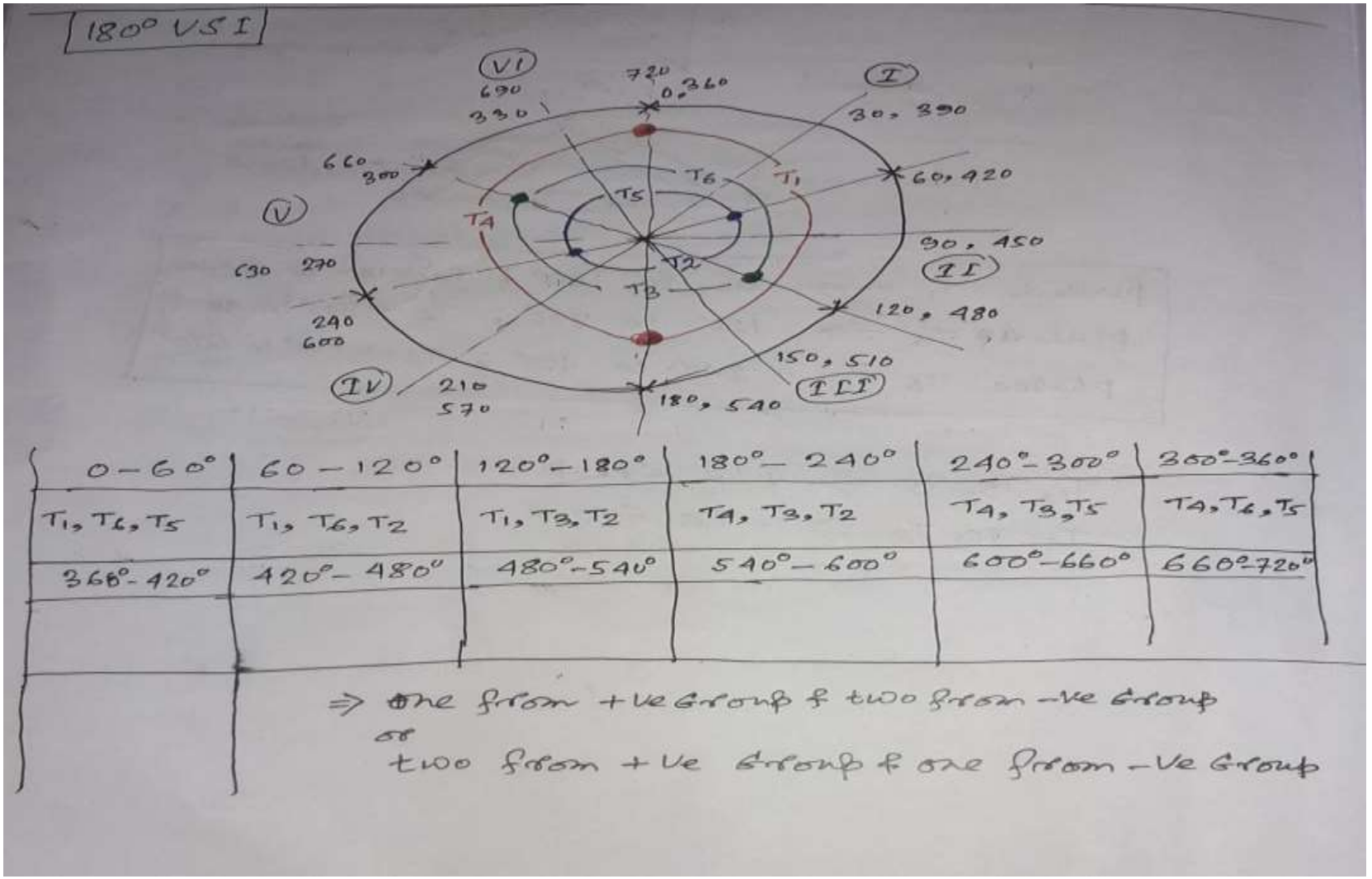

0 – 60°	60 – 120°	120° – 180°	180° – 240°	240° – 300°	300° – 360°
T_1, T_6, T_5	T_1, T_6, T_2	T_1, T_3, T_2	T_A, T_3, T_2	T_A, T_3, T_5	T_A, T_6, T_5
360° – 420°	420° – 480°	480° – 540°	540° – 600°	600° – 660°	660° – 720°

⇒ one from +ve Group & two from –ve Group
or
two from +ve Group & one from –ve Group

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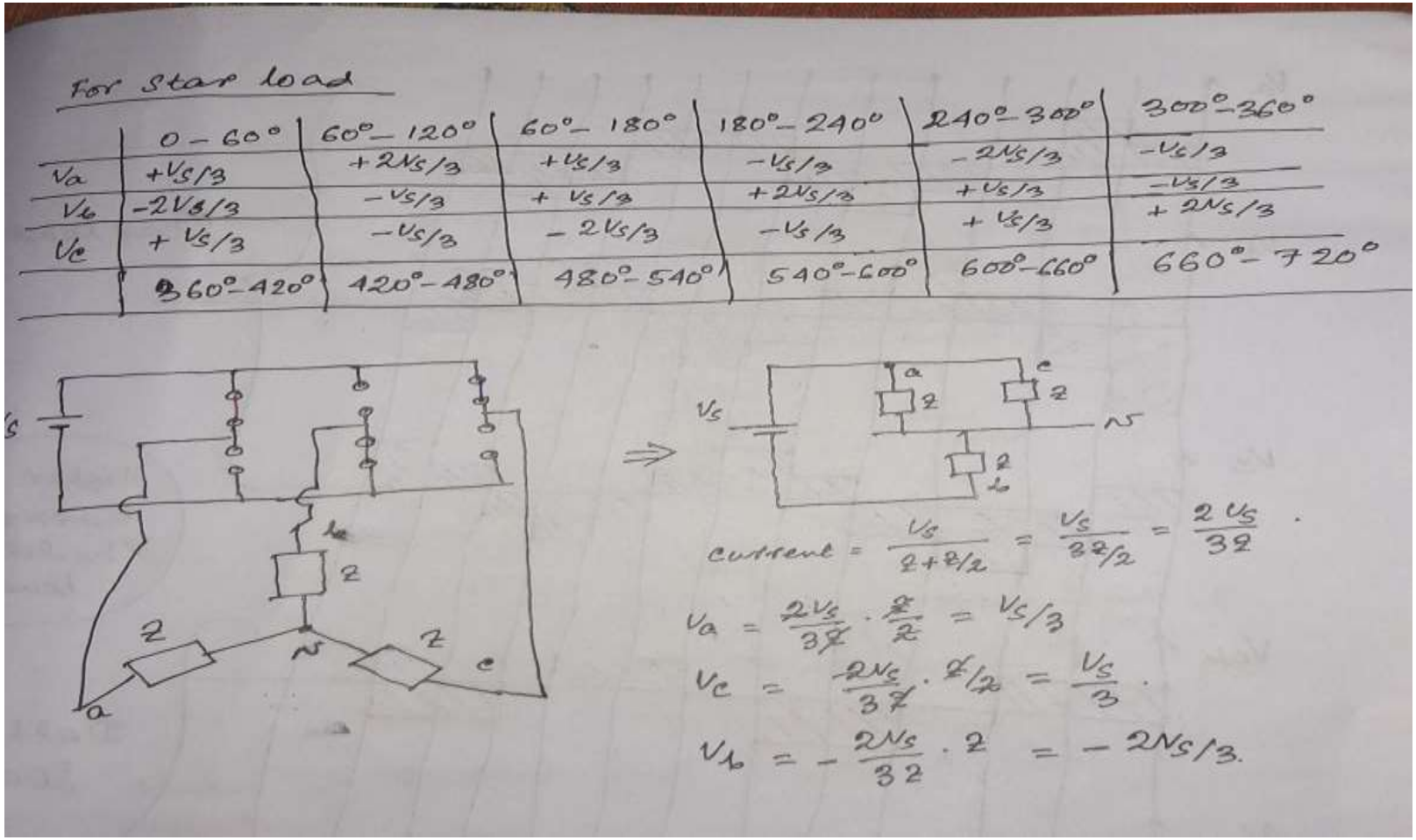

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	0–60	60–120	120–180	180–240	240–300	300–360
V_{ab}	$+V_s$	$+V_s$	0	$-V_s$	$-V_s$	0
V_{bc}	$-V_s$	0	$+V_s$	$+V_s$	0	$-V_s$
V_{ca}	0	$-V_s$	$-V_s$	0	$+V_s$	$+V_s$
	360–420	420–480	480–540	540–600	600–660	660–720

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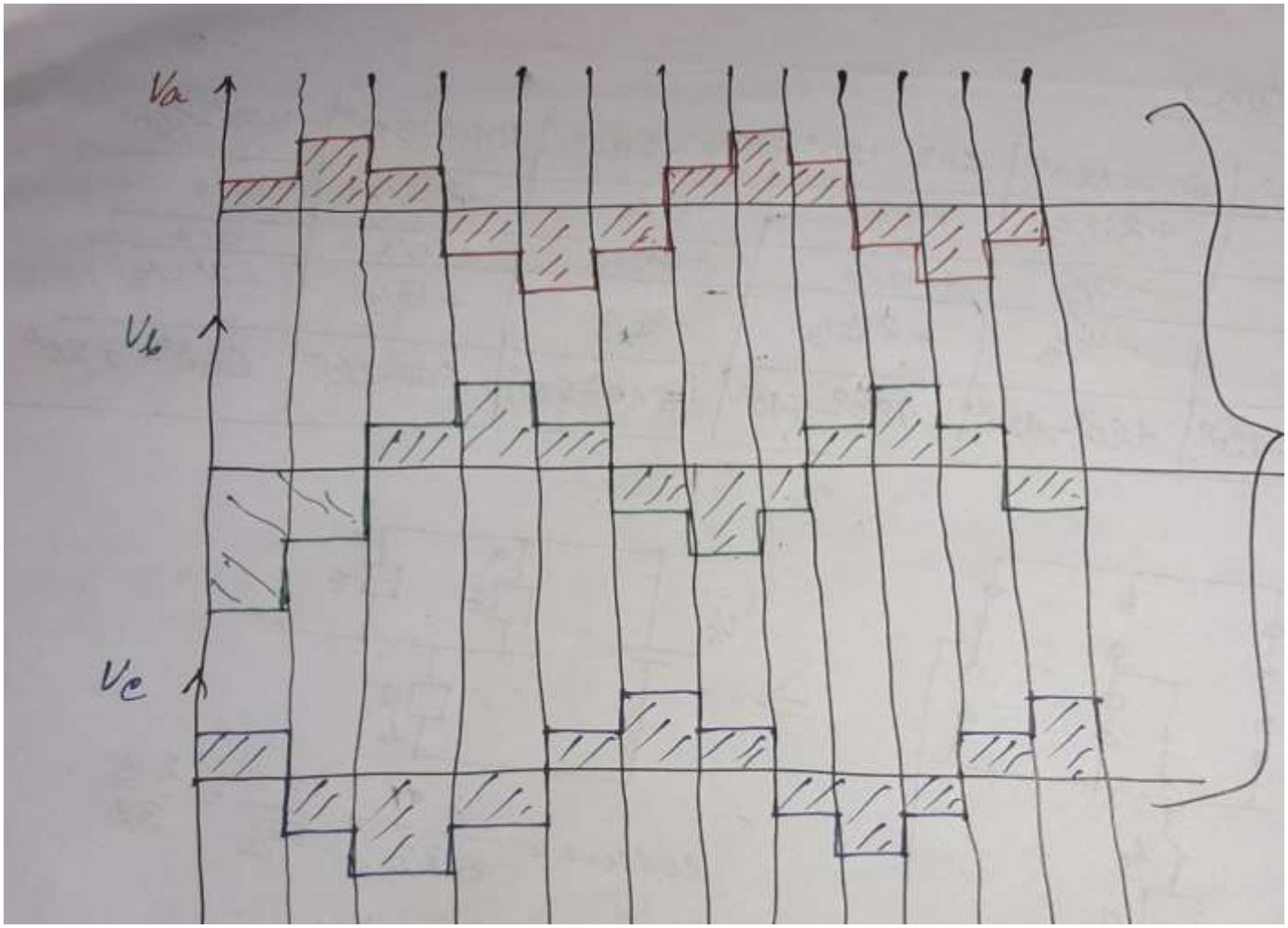

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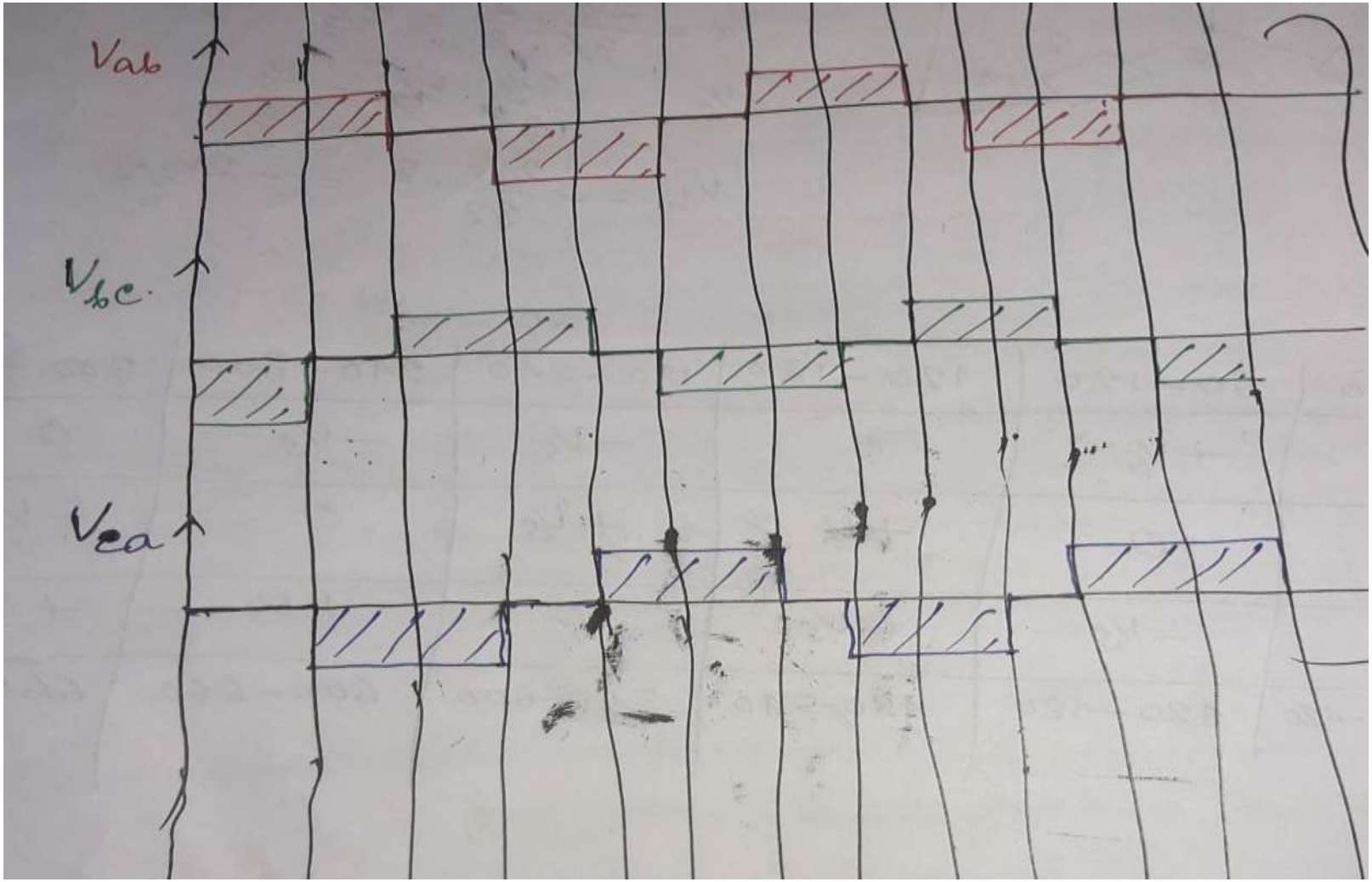

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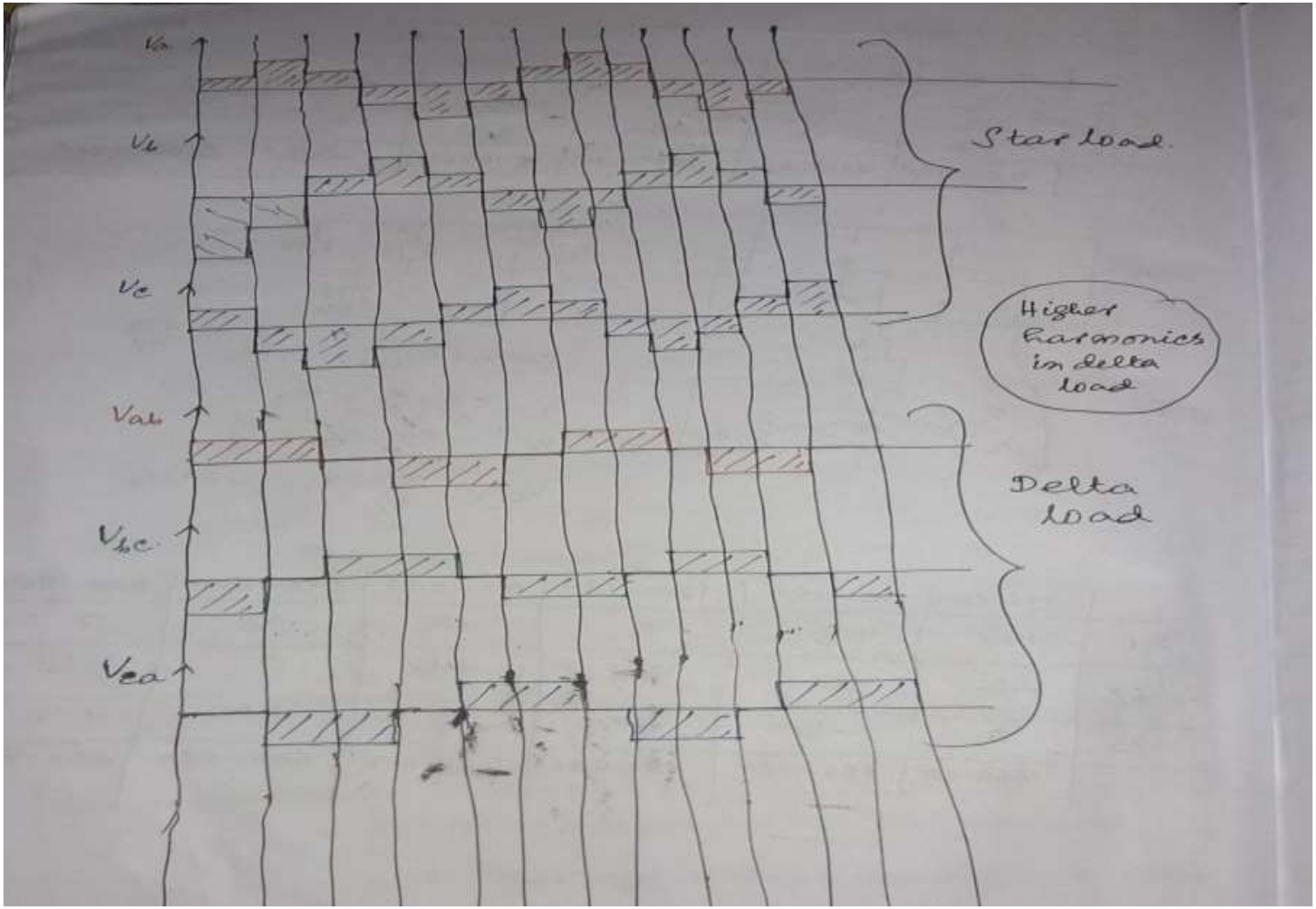

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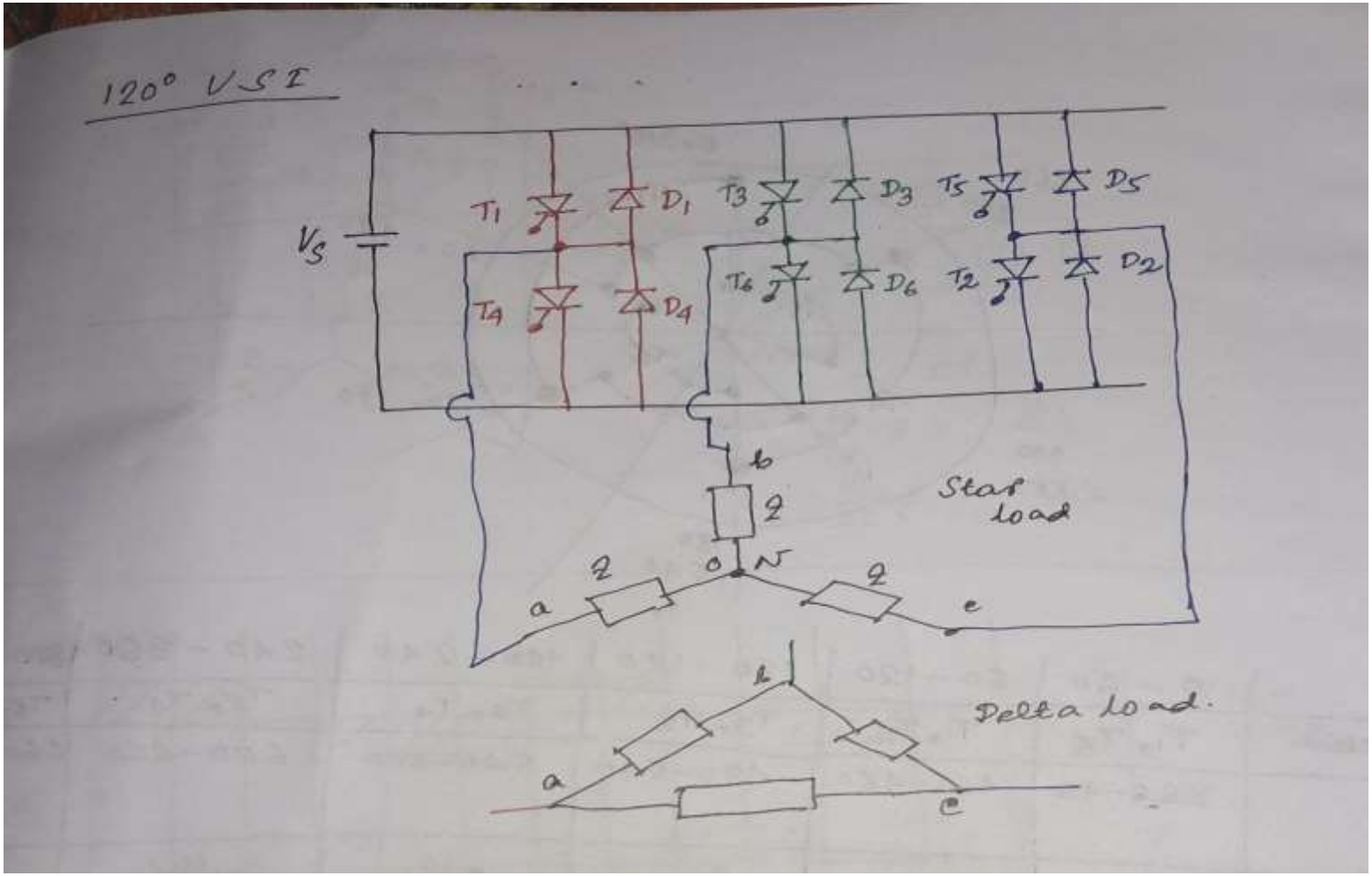

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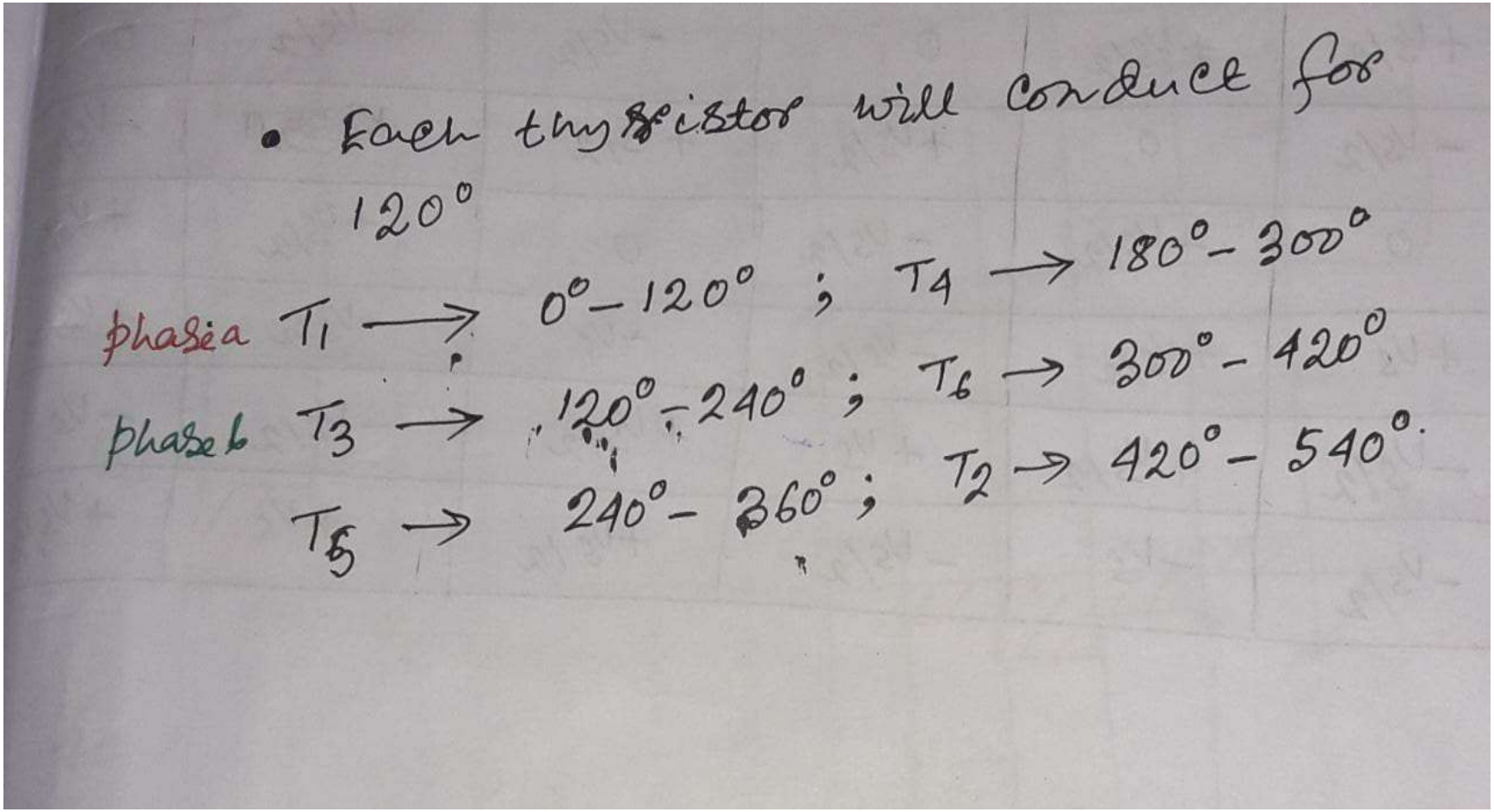

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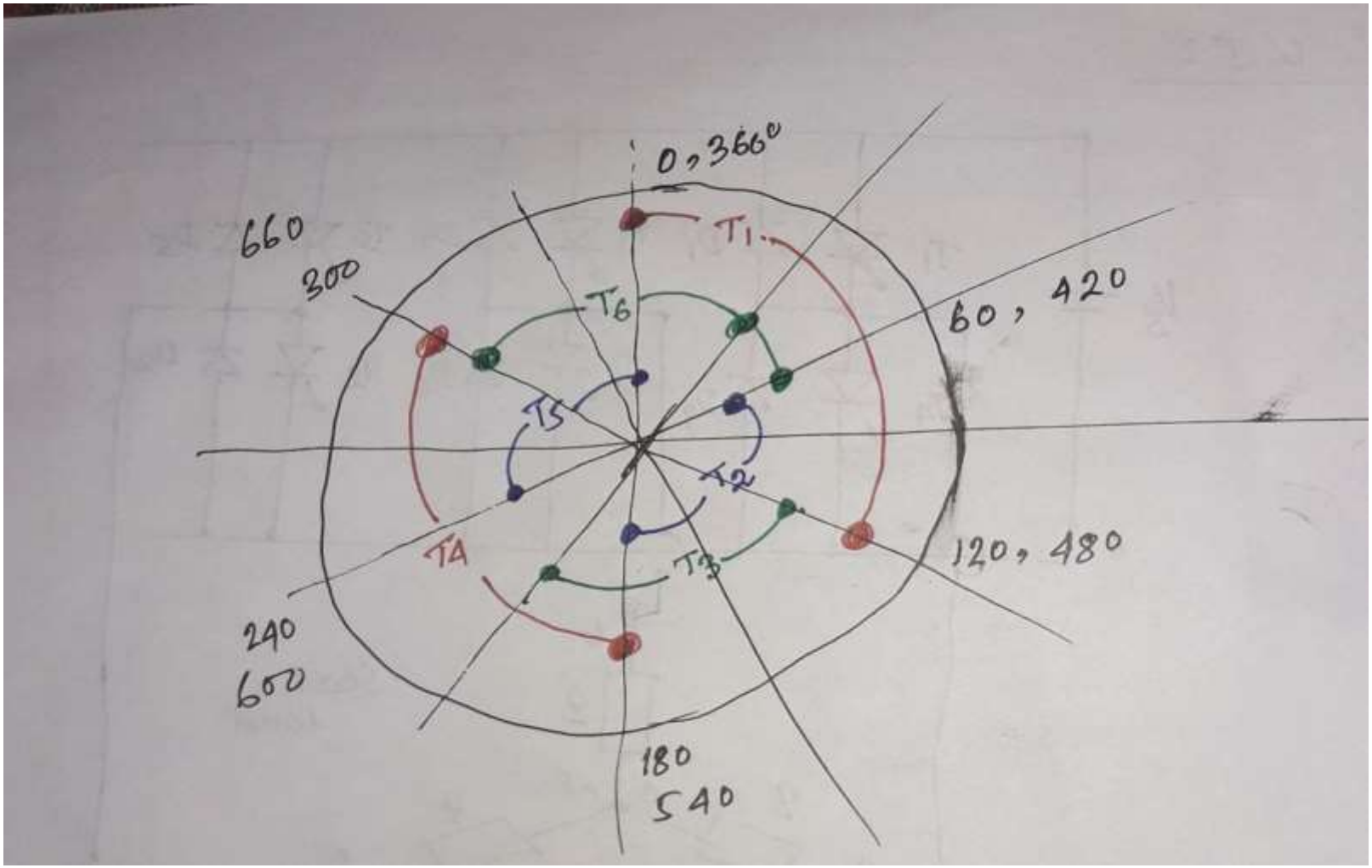

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	0 – 60	60 – 120	120 – 180	180 – 240	240 – 300	300 – 360
Conduction	T_1, T_6	T_1, T_2	T_3, T_2	T_3, T_4	T_5, T_4	T_5, T_6
	360 – 420	420 – 480	480 – 540	540 – 600	600 – 660	660 – 720
V_a	$+V_s/2$	$+V_s/2$	0	$-V_s/2$	$-V_s/2$	0
V_b	$-V_s/2$	0	$+V_s/2$	$+V_s/2$	0	$-V_s/2$
V_c	0	$-V_s/2$	$-V_s/2$	0	$+V_s/2$	$+V_s/2$
V_{ab}	$+V_s$	$+V_s/2$	$-V_s/2$	$-V_s$	$-V_s/2$	$+V_s/2$
V_{bc}	$-V_s/2$	$+V_s/2$	$+V_s$	$+V_s/2$	$-V_s/2$	$-V_s$
V_{ca}	$-V_s/2$	$-V_s$	$-V_s/2$	$+V_s/2$	$+V_s$	$+V_s/2$

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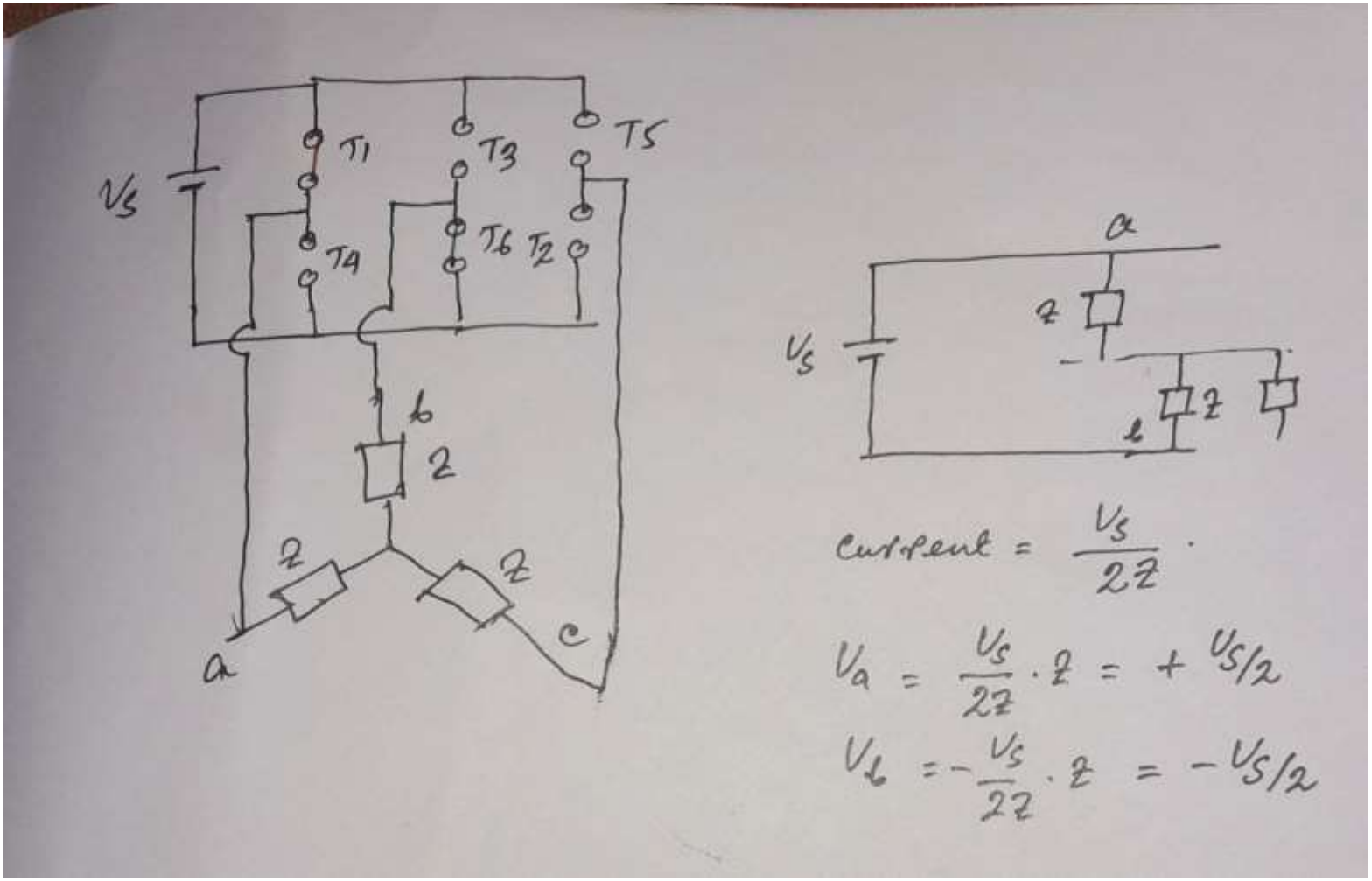

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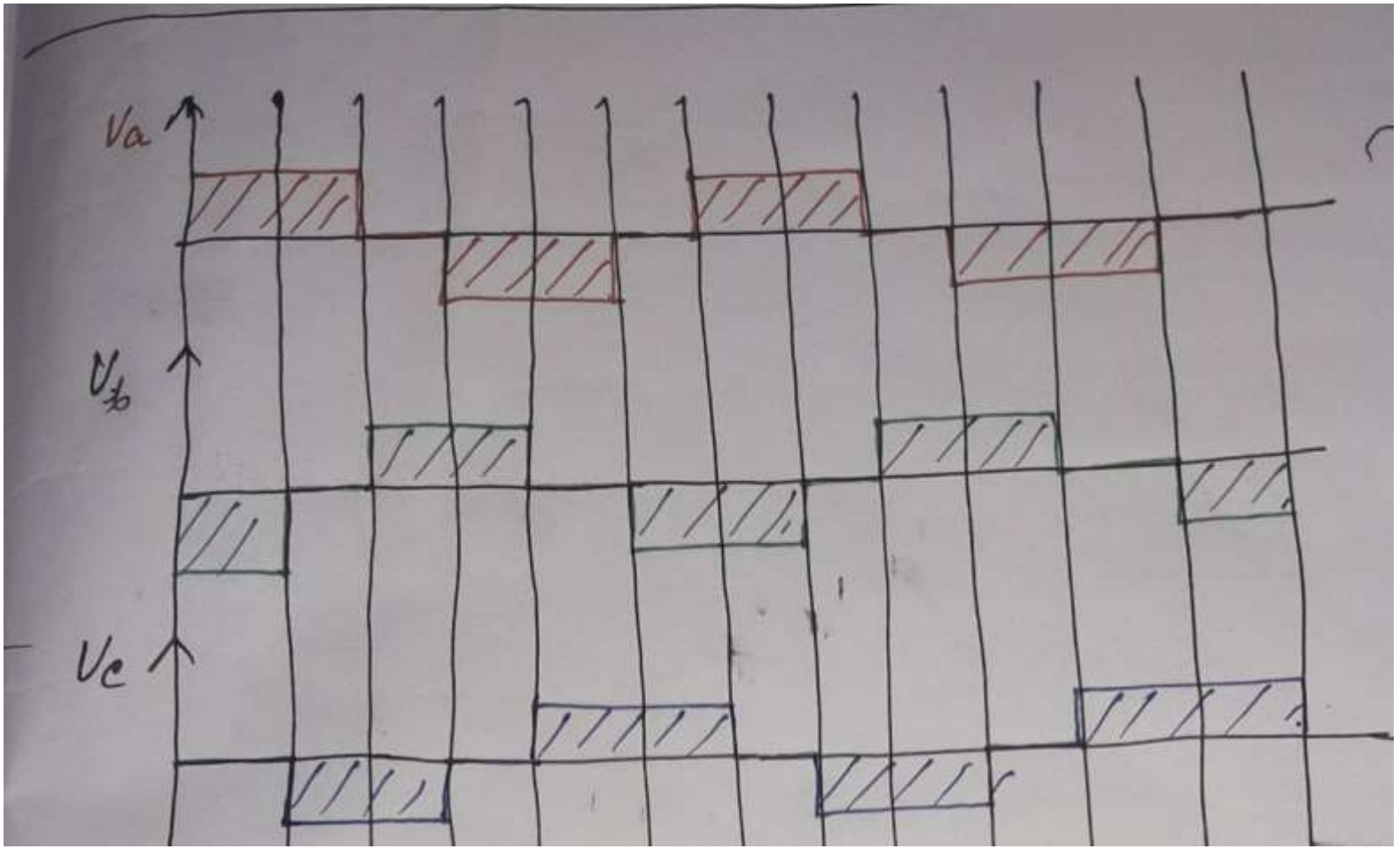

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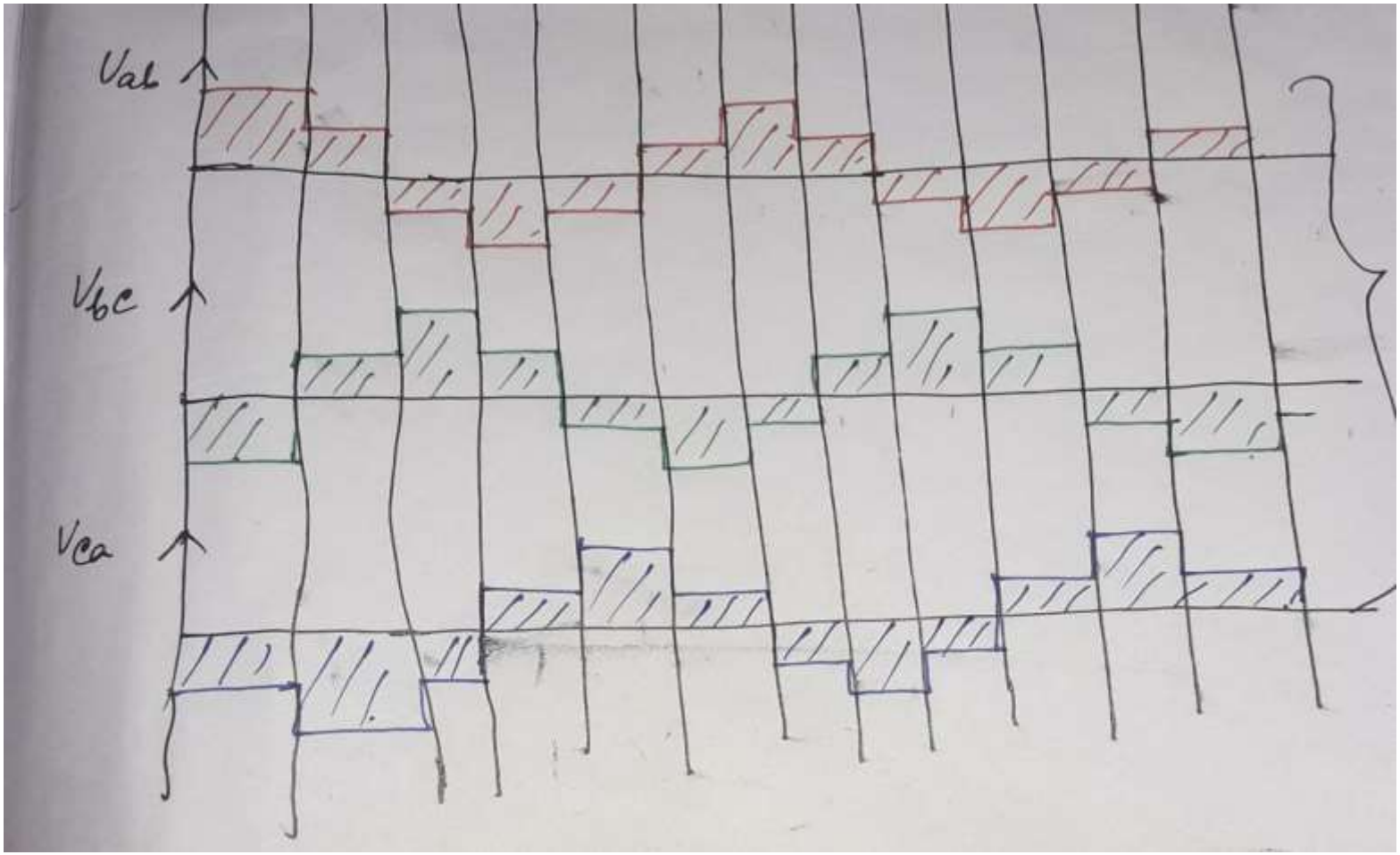

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