

Unit 9 - Week 8

Course outline

How does an NPTEL online course work?

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Neutral Point Clamped Converter - Circuit Topology (Part II)

Neutral Point Clamped Converter - Space Vector Diagram

Neutral Point Clamped Converter - Space Vector PWM

NPC - Sinusoidal PWM and Space Vector PWM using Single Carrier Strategy

Lecture Slides Week 8

Quiz : Assignment 8

Week 8 Feedback Form

week 9

Week 10

Week 11

Week 12

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Assignment Solutions

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Assignment 8

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

Group A

A 3-phase neutral point clamped converter has DC-link voltage = 800 V. The converter is operated using sinusoidal PWM with switching frequency = 1 kHz, fundamental frequency = 50 Hz and modulation index (m) = 0.9. The converter is feeding power to a balanced 3-phase R-L load where R= 10 ohms/phase and L = 3 mH/phase.

1) The fundamental rms value of output pole voltage of the converter is closest to,

2 points

- 1000 V
- 500 V
- 2000 V
- 255 V

No, the answer is incorrect. Score: 0

Accepted Answers: 255 V

2) The magnitude of line current in rms is closest to,

1 point

- 50 A
- 25 A
- 10 A
- 17 A

No, the answer is incorrect. Score: 0

Accepted Answers: 25 A

Group B

3) The resultant space vector for (0 - -) combination of switching is,

1 point

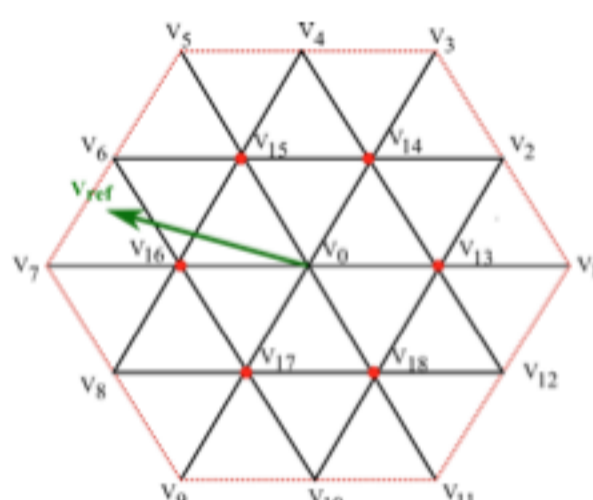
- $\frac{2}{3}V_d * e^{j\frac{\pi}{3}}$
- $\frac{1}{3}V_d * e^{j\frac{2\pi}{3}}$
- $\frac{1}{3}V_d * e^{j0}$
- $\frac{1}{\sqrt{3}}V_d * e^{j\pi}$

No, the answer is incorrect. Score: 0

Accepted Answers: $\frac{1}{3}V_d * e^{j0}$

4) For the given V_{ref} vector shown in the following space vector diagram, the pivot vector is,

1 point



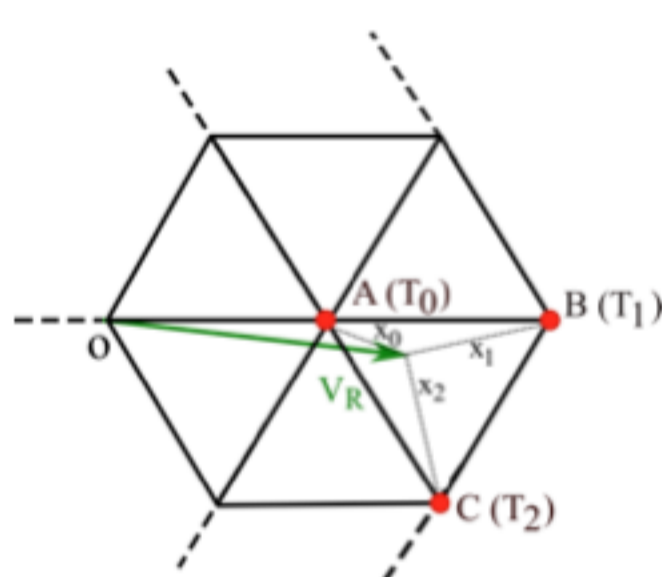
- V_{15}
- V_{16}
- V_6
- V_7

No, the answer is incorrect. Score: 0

Accepted Answers: V_{16}

5) The location of a reference vector (V_R) is shown in the small hexagon of three-level space vector diagram in the given figure. If $X_0 < X_1 < X_2$, then which among the following condition is true for T_0, T_1 and T_2 timing durations of A, B and C vectors respectively

2 points



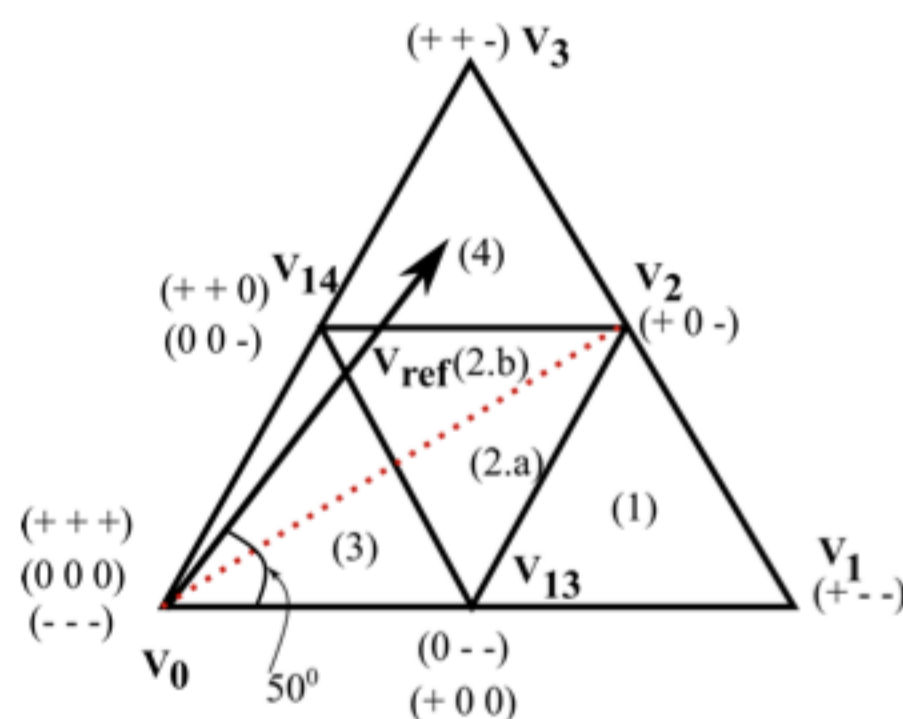
- $T_0 = T_1 = T_2$
- $T_0 < T_1 < T_2$
- $T_0 > T_1 > T_2$
- $T_0 > T_1 = T_2$

No, the answer is incorrect. Score: 0

Accepted Answers: $T_0 > T_1 > T_2$

6) For realizing the reference vector (V_{ref}), which among the following switching sequence is correct (consider minimum instantaneous error),

2 points



- (+ + -), (+ 0 -), (+ + 0), (+ + -)
- (+ 0 -), (0 - -), (0 0 -), (+ 0 -)
- (+ 0 0), (+ 0 -), (0 0 -), (0 - -)
- (+ + 0), (+ + -), (+ 0 -), (0 0 -)

No, the answer is incorrect. Score: 0

Accepted Answers: (+ + 0), (+ + -), (+ 0 -), (0 0 -)

7) In question 6, if the reference vector shifts its position from sector 4 to sector (2.b), what is the change that can be observed in starting vector,

1 point

- It does not change
- It changes to zero vector V_0
- It changes to V_{13}
- It changes to V_2

No, the answer is incorrect. Score: 0

Accepted Answers: It does not change