

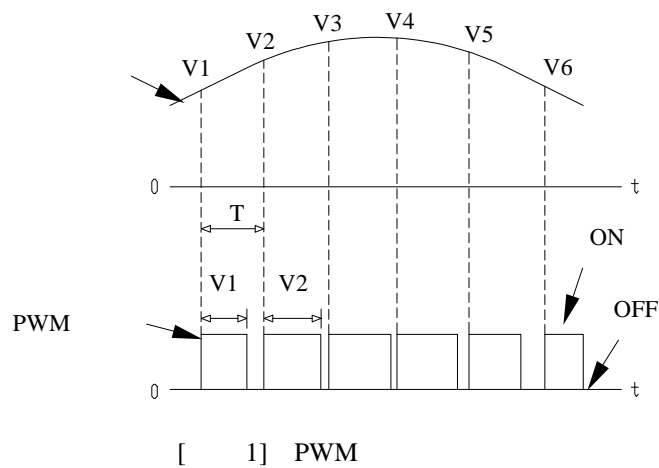
(current control) (Pulse Width Modulation,  
PWM) PWM .

1. PWM(Pulse Width Modulation, )

PWM (Analog) (Digital) ,

1

PWM



PWM

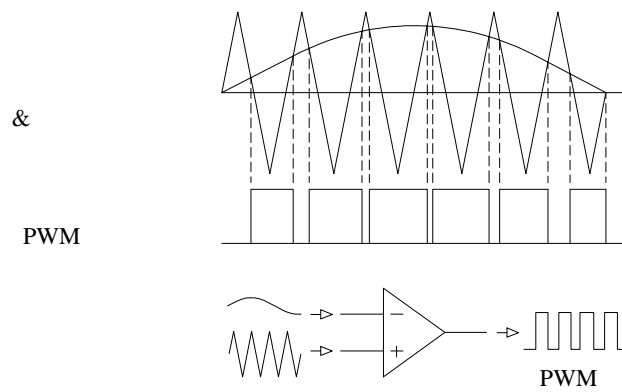
$V1$   $V2$  가 PWM  $V1, V2$

PWM

가

PWM

2



[ 2]

PWM

2 가 (Comparator) ,  
 PWM .  
 , 가 ON ,  
 가 OFF .  
 PWM .

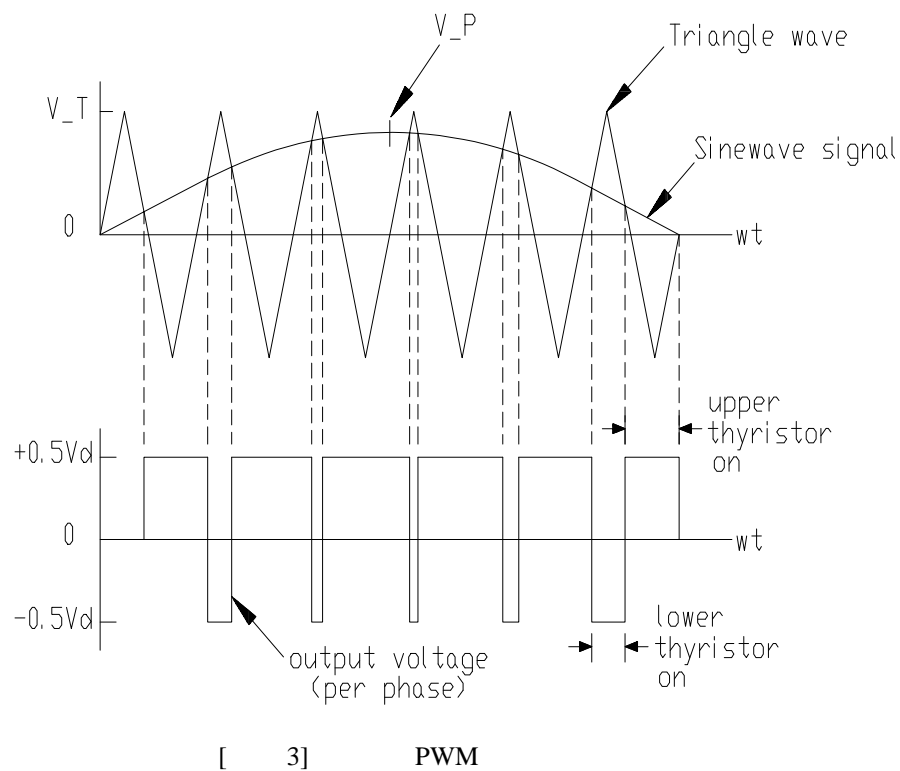
## 2. PWM

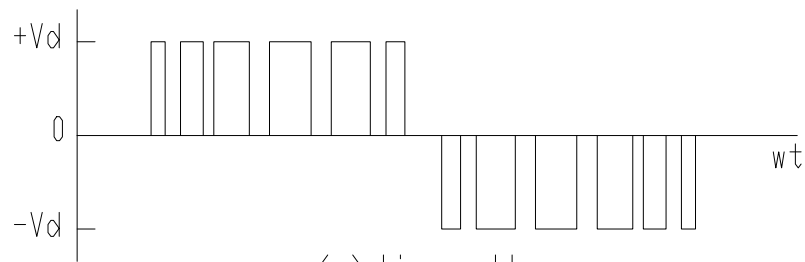
, 가  
 .  
 (6n±1)  
 , 6 가  
 , .  
 DC LC .  
 (PWM )  
 . "PWM " . ,  
 3 , 가  
 PWM . PWM 가 .  
 가 ,  
 .  
 PWM 3 가 .

- PWM (Sinusoidal PWM method)
- PWM (Hysteresis PWM method)
- PWM (Space-Vector PWM method)

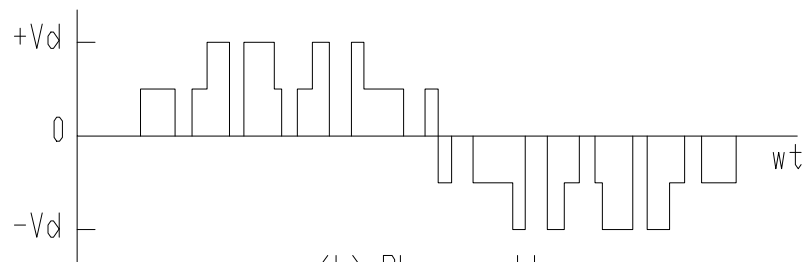
## 2-1. PWM (Sinusoidal PWM inverter)

PWM ,  
 3 PWM .  
 가 ,  
 ,  
 PWM 가  
 가 PWM  
 (Triangular method), (Subharmonic method),  
 (Suboscillation method) .





(a) Line voltage



(b) Phase voltage

[ 4] PWM

4

가

(Fourier analysis)

$$v(t) = m \frac{V_d}{2} \sin(\omega_s t + \phi) +$$

,  $m$  : (Modulation index)

$\omega_s$  : (Fundamental frequency)

$\phi$  :

( )

$m$

$$m = \frac{V_P}{V_T}$$

,  $V_P$  : (or modulation wave)

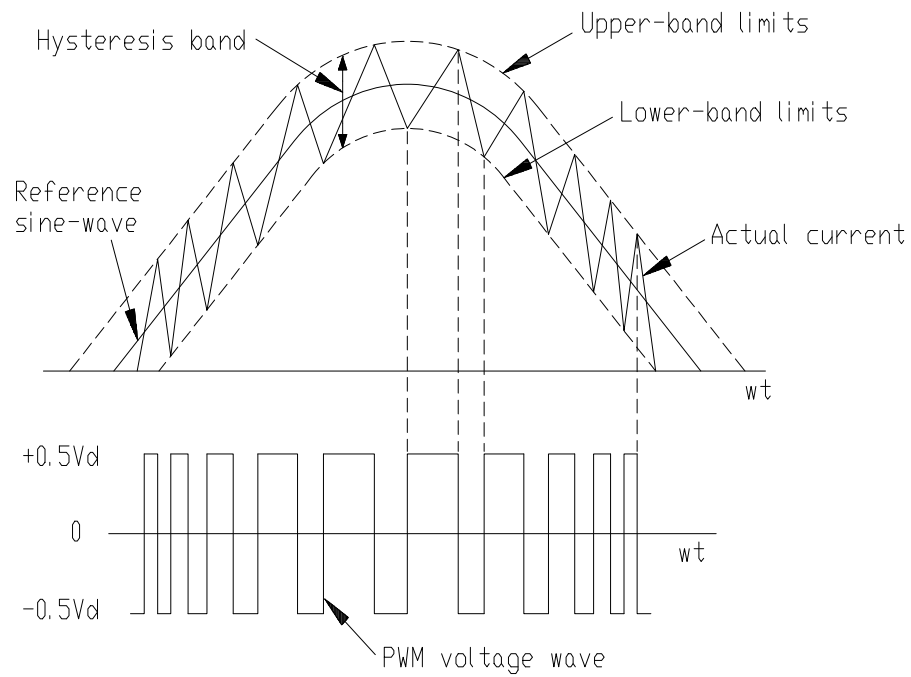
$V_T$  : (or carrier wave)

$m$  .  $V_T$   
 $V_P$  가  $m < 1$  (Linear modulation)  
 $m > 1$  (Over-modulation) .  
 .  
 (carrier-to-modulating frequency ratio, P) .  

$$P = \frac{F_c}{F_m}$$
 $F_c$  : (carrier wave)  
 $F_m$  : (modulation wave)  
 $P$   
 $P^3$  ,  $F_c$   
 $700 \sim 1000\text{Hz}$  ,  $P = 168(F_m < 6\text{Hz})$   $15(F_m > 50\text{Hz})$  ) .  
 , PWM ,  
 (modulation index, m) (carrier-to-modulating frequency ratio, P)가  $m$   
 ,  $P$   
 .

## 2-2. PWM (Hysteresis PWM inverter)

PWM DC  
 가 3 LC  
 가 , .  
 PWM 가  
 . PWM " PWM " "  
 PWM " .  
 5 PWM ,  
 PWM (Voltage Control Method) (current control method) .



[ 5] PWM

5 (Reference sine-wave) PWM

PWM

- $\geq$   $\Rightarrow$  Upper Tr : Turn-off, Lower Tr : Turn-on
- $\leq$   $\Rightarrow$  Upper Tr : Turn-on, Lower Tr : Turn-off

5 PWM

가