

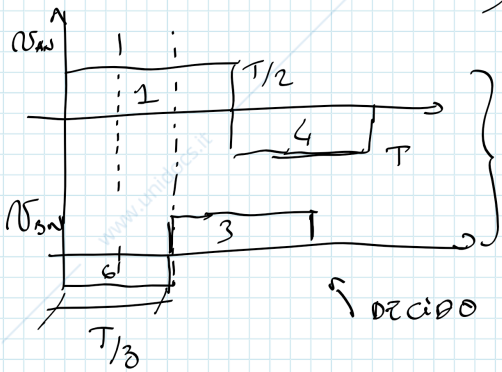
$\bar{V}_{AG} + \bar{V}_{BG} + \bar{V}_{CG} = 0$ sempre
 $\bar{V}_{AN} + \bar{V}_{BN} + \bar{V}_{CN} = 0$ sempre
 } LKT, LKC

$\bar{V}_{AN} = \bar{V}_{AG} + \bar{V}_{GN}$
 $\bar{V}_{BN} = \bar{V}_{BG} + \bar{V}_{GN}$
 $\bar{V}_{CN} = \bar{V}_{CG} + \bar{V}_{GN}$

↑ DECIDERE LA FORMA DI $\bar{V}_{AN}, \bar{V}_{BN}, \bar{V}_{CN}$ (freq)

ANALISI MAT.

solo le dispari $V_k = \frac{1}{k} V_1$



es. $T = 20ms$

$$\bar{V}_{AN}(t) = \frac{4}{\pi} \frac{V_{oc}}{2} \left(\sin \omega t + \frac{1}{3} \sin 3\omega t + \frac{1}{5} \sin 5\omega t + \dots \right)$$

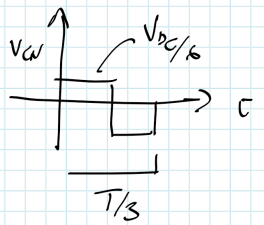
$$\bar{V}_{BN}(t) = \frac{4}{\pi} \frac{V_{oc}}{2} \left(\sin \left(\omega t - \frac{2\pi}{3} \right) + \frac{1}{3} \sin 3 \left(\omega t - \frac{2\pi}{3} \right) + \dots \right)$$

$$\bar{V}_{CN}(t) = \frac{4}{\pi} \frac{V_{oc}}{2} \left(\sin \left(\omega t + \frac{2\pi}{3} \right) + \frac{1}{3} \sin 3 \left(\omega t + \frac{2\pi}{3} \right) + \dots \right)$$

$$\bar{V}_{AN} = \frac{\bar{V}_{AG} + \bar{V}_{GN}}{3}$$
 (3 arm e mult. 3 (dispari))

$$\bar{V}_{AN} + \bar{V}_{BN} + \bar{V}_{CN} = \bar{V}_{AG} + \bar{V}_{BG} + \bar{V}_{CG} + 3\bar{V}_{GN}$$

$$\bar{V}_{GN} = \frac{\bar{V}_{AN} + \bar{V}_{BN} + \bar{V}_{CN}}{3} = 0$$



$$\bar{V}_{AN_3} = \frac{1}{3} \sin 3\omega t$$

$$\bar{V}_{BN_3} = \frac{1}{3} \sin 3\omega t$$

$$\bar{V}_{CN_3} = \frac{1}{3} \sin 3\omega t$$

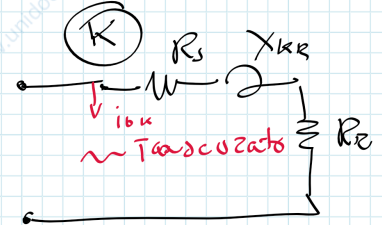
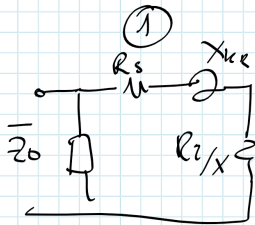
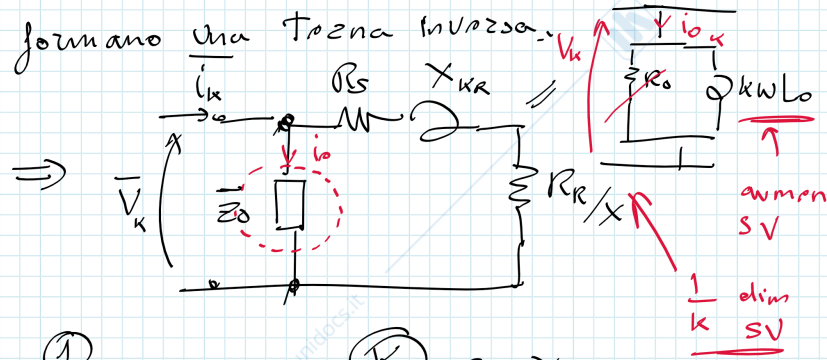
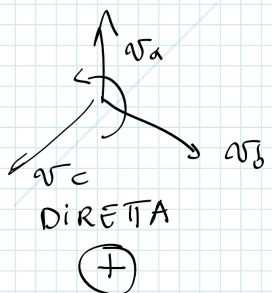
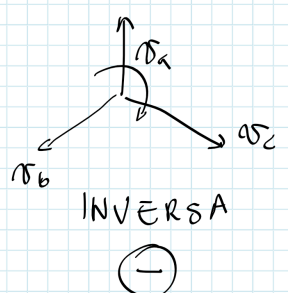
sono in fase

$$\bar{V}_{AN_3} + \bar{V}_{BN_3} + \bar{V}_{CN_3} = \sin 3\omega t / 3$$

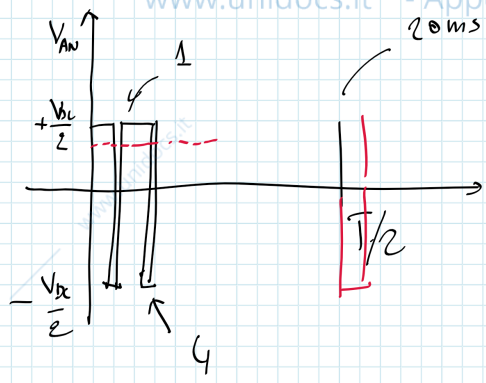
\bar{V}_{GN} = arm 3 e multipli =

$\bar{V}_{AG}, \bar{V}_{BG}, \bar{V}_{CG}$ = tutte le altre dispari (1, 5, 7, ...) (1, -5, +7, -11, +13, ...)

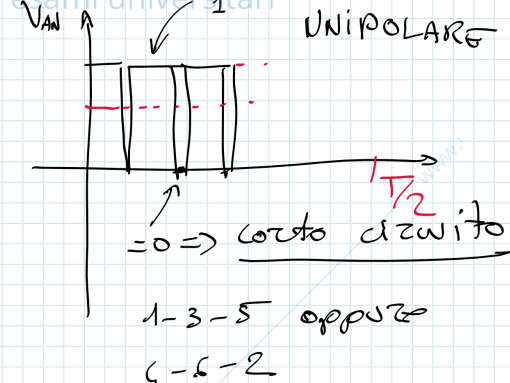
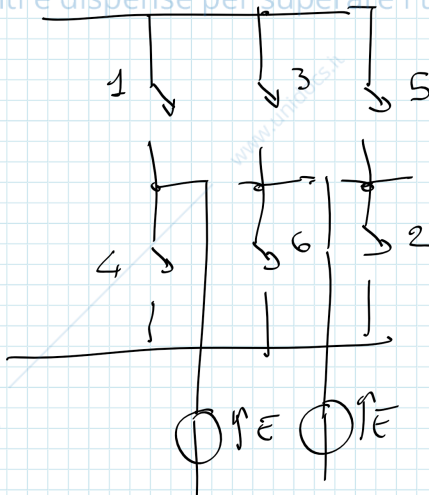
↑ le quinte armoniche formano una triaza inversa.



$\omega \ll$ campo magn. dip. solo 1 arm. $\approx \omega m$
 $X_s = \frac{7\omega - \omega m}{7\omega} \approx \frac{6}{7} \approx 1$

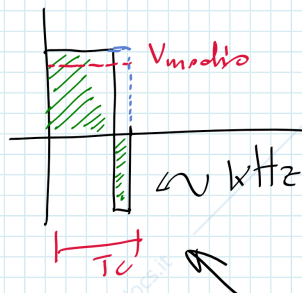


BIPOLARE

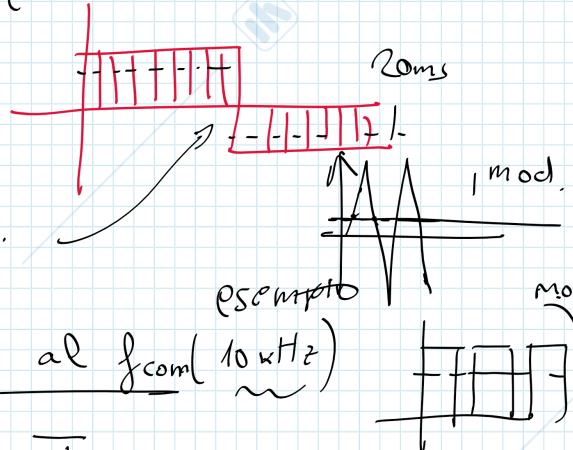


UNIPOLARE

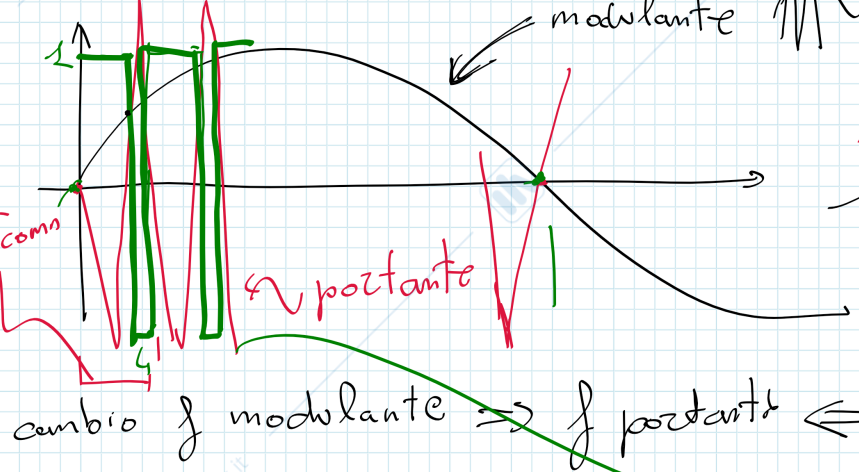
$= 0 \Rightarrow$ costo circuito
1-3-5 oppure
4-6-2



armoniche app. al motore diventano.
la 1 alla f. princ. = 50 Hz
+ armonico attorno al f_{com} (10 kHz)

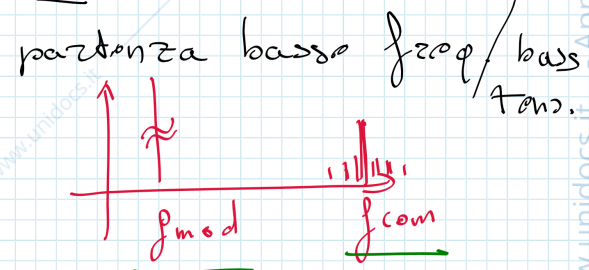


SOTTO OSCILLAZIONE SINUSOIALE

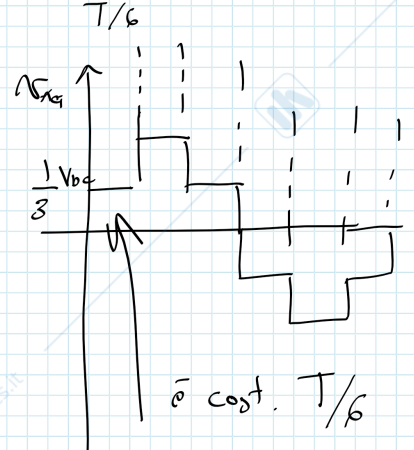
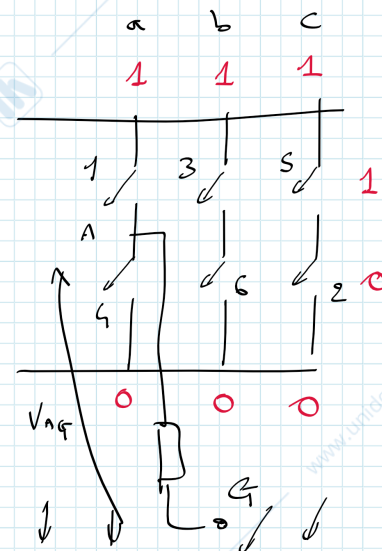
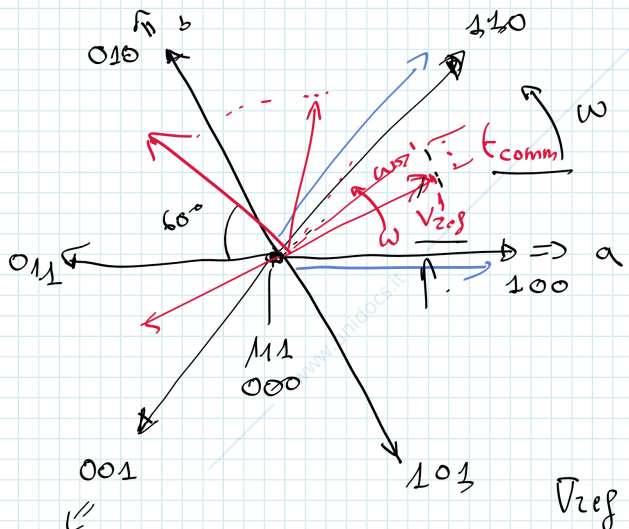


mod. > port
1 arm \rightarrow modulante
mod < port

cambio f modulante \Rightarrow f portante \Leftarrow
freq varia nel tempo
 $f_{mod} - f_{port}$

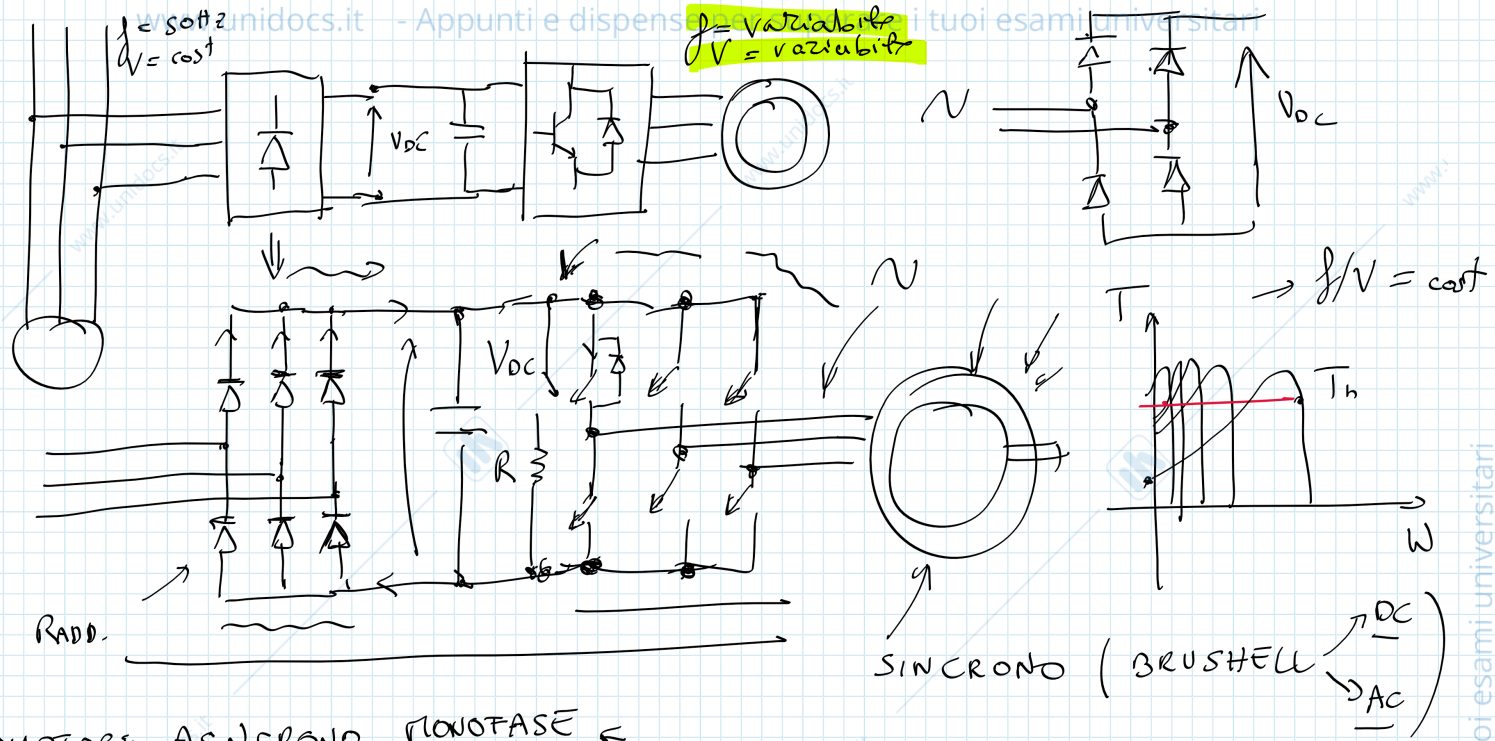


SPACE-VECTOR MODULATION



$$V_{ref} = T_1(100) + T_2(110) + T_0(000) \rightarrow T_1 + T_2 + T_0$$

$$\bar{v} = \sqrt{\frac{2}{3}} (\alpha v_a + \alpha^2 v_b + \alpha v_c)$$



→ MOTORE ASINCRONO FASE

