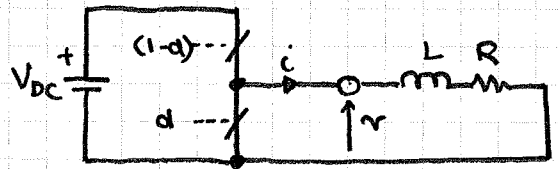


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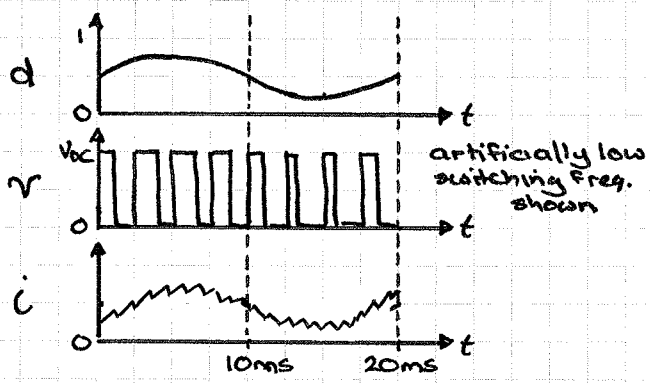
Aim: introduce 3ph inverter control using a package like dSPACE

1. OPEN-LOOP VOLTAGE CONTROL

1.1. Single-Phase Control



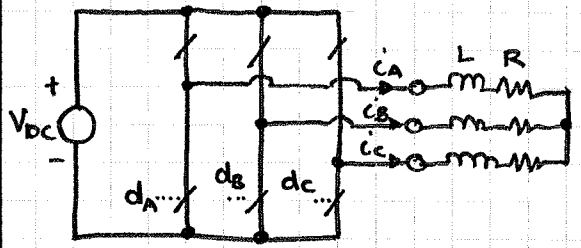
Connect an RL load (e.g. a large wire-wound variable slide resistor) between the output of the phase-leg and ground. Apply a PWM control signal to the low and high-side gate drives using a switching frequency in the range 10-20kHz. Modulate the duty-cycle in a sinusoidal fashion with a fundamental frequency of say 50Hz.



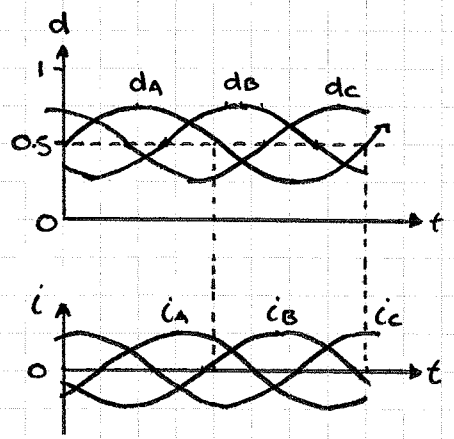
The duty-cycle d should have an average value of 0.5. The switching frequency and inductance should be high enough that the PWM current ripple should be small (e.g. <20%) of the total current amplitude.

Demonstrate varying both the fundamental component frequency and amplitude.

1.2. Three-Phase Control



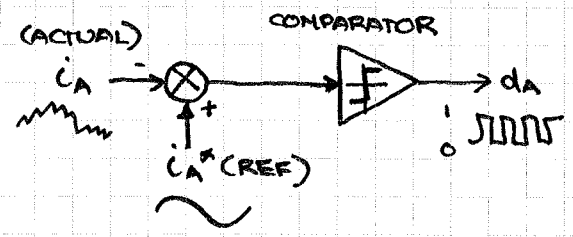
Connect a 3ph star-connected RL load to the output of the inverter.



Demonstrate 3ph balanced currents with low current ripple (not shown). Vary the fundamental voltage and frequency.

2. CLOSED-LOOP CURRENT CONTROL

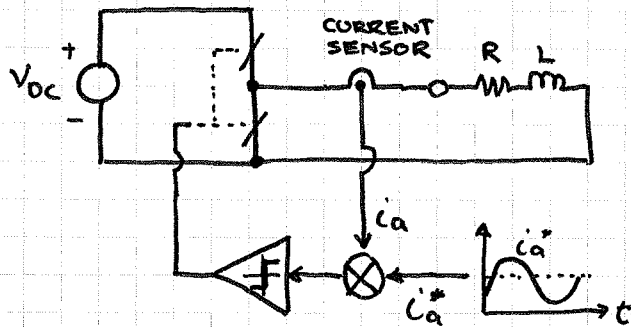
Apply a simple hysteresis current control (actually, constant switching frequency, comparator control). Need measurement of phase output currents.



If the above system is sampled at a constant switching frequency e.g. 10kHz, then it is not necessary that the comparator have hysteresis.

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Closed-loop current control applied to one phase-leg. Current command must have a DC offset.

The same concept can be extended to a 3ph inverter with three current sensors and three comparators. In this case, balanced three-phase current commands can be used with no DC offset.