\[ I_m = \pm I \]
\[ V_m = \{ V \}
\[ 0 \]
Multilevel (Chain Link) converter


Wikipedia article:

HVDC Converters ... good graphics

Review: 2-level converters; 6 switches (3 phase), 8 switching states; six-step waveforms (old) ... Pulse Width Modulation (PWM) current technology; High switching frequency and the filtering action of the load (or inserted filters) gives a sinusoidal output current; switches can mitigate faults nearby; issues include switch losses, EMI, harmonics, voltage limits

Multilevel converters...neutral point clamped inverter

*Many switching states (27 for a 3-level converter..._____ for a 4-level converter...); Stepped or PWM output possible, often a combination thereof; high switching frequency and the filtering action required at the load to get nearly sinusoidal current; switches can mitigate faults nearby; As a percentage of total power processed, switching losses can be less than a similar 2-level converter; higher voltage levels at the load are possible; new problem of balancing the dc voltages on the capacitors.
We now look at a converter that has become attractive the past few years, often for projects that the utilities find appropriate: Multilevel Modular Converter (MMC), also known as the Chain Link Converter.

Marquardt et al proposed this converter in 2003. First employed in a commercial project, the Trans Bay Cable, in San Francisco-Oakland in 2010.

How does it work?

- Modular
- Multilevel
- Converter

Bidirectional voltage and current

Multilevel: it works by having exactly half of the modules in each phase supporting the DC voltage.