The MMC topology is used mainly for power conversion and transmission.
Switching losses and harmonic content are lower.
The circuit configurations are modular and scalable.
Rating of components are low voltage.
Low THD output voltages with reduced $dv/dt$ stresses.
Low $di/dt$ of arm currents.
There is no need for passive filters on AC and DC sides.

**Overview**

**Motivation**

- VSC behaves as a harmonic load from grid point of view if a proper control scheme is not implemented.
- Tracking performance of PI controller is not satisfactory when they have to regulate coupled systems.
- In order to improve the performance of the PI current controllers in such systems, decoupling terms ($+wL_{qc}-wL_{dq}$) and feed-forward terms need to be used.
- Implementing the feed-forward current control scheme allows:
  i. Not to concern about bandwidth and stability characteristics
  ii. Less dependence on PI controllers
  iii. Improvement on the system dynamic
  iv. Minimizes the second harmonic in the circulating current
  v. No negative effect on the main control algorithm
  vi. Decreases THD in the grid currents of the converter

**Method**

The proposed method is based on the DC and AC components of grid currents.

$v_{m,a} = v_{a,d} - wL(i_{q,dc} - i_{q,ac}) + e$

$v_{m,d} = v_{a,q} + wL(i_{d,dc} - i_{d,ac}) + e$

**Results**

- Active power reversal is applied at $t=0.15s$ from -500 MW to 500 MW.
- Reactive power remains unchanged.

**Conclusion**

- Dynamic response of the system improves
- Proposed method reduces disturbances
- Less dependence on PI controllers
- More efficient in tracking

**References**