



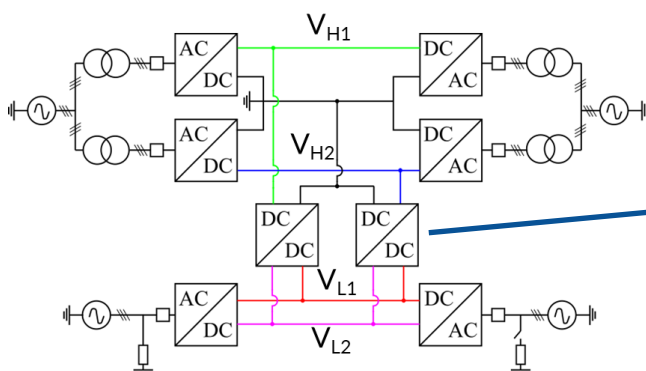
DC/DC converter to interconnect a bipole and symmetric monopole

CONTEXT

It is expected that in the future electrical system there would be bipole as well as symmetrical monopole HVDC system. Interconnecting these systems would require that inherent bipole ability to transmit half the power in the case of fault is maintained. Indeed, the dc/dc converter used to achieve the interconnection should be designed to stop propagation of disturbance from the faulty pole to the healthy pole. Moreover, as a bipole in degraded mode, it can be viewed as an asymmetric monopole. The converter used for the interconnexion should be able to interconnect a symmetric monopole and an asymmetric monopole. The known candidate converter topologies to interconnect a bipole and symmetric monopole are either based on front-to-front converters or need a reconfiguration following the fault. In the first case, the full power of the converter is converted from ac to dc and then from dc to ac. In the second case, after a fault, the converter should be blocked, disconnectors should be actuated and the converter should be restarted. This means that there is a transient loss of power in the healthy pole of the bipole. If this could be accepted for rigid bipoles, it is not the expected behavior a bipole with metallic return.

TECHNOLOGY DESCRIPTION

The proposed solution is to install a dc/dc converter for each pole of the bipole (as for classic ac/dc converters for bipole). Both dc/dc converters are connected to the symmetric monopole. In case of fault on a pole of the bipole, only one converter is blocked and the other continue to operate. The proposed dc/dc converters have a non-isolated topology with three arms per leg (with the number of legs being a degree of freedom, 3 in the figure opposite). In each leg, one arm includes full-bridge submodule to allow the fault blocking capability.



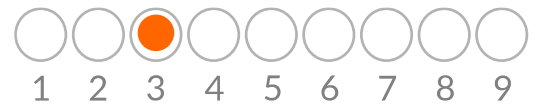
APPLICATION DOMAIN

- Interconnection of DC systems
- HVDC

ADVANTAGES

- Increased modularity
- Adapted to a wide range of voltage ratios

TRL SCALE



DELIVERABLES

- PATENT APPLICATION FR + PCT
- Simulation files

SCIENTIFIC REFERENCE

- PhD Thesis chapter

