Transformer based active snubber

For series connected devices

CONTEXT

For series connected devices used within power converters snubber circuits are fitted to ensure adequate voltage sharing. Active snubber circuits can bring advantage in terms of size and volume of such circuit, for example for HVDC LCC application such circuit have been proposed by GE. One of the main difficulties in realizing active snubber circuit is in the ability to find suitable semiconductor device with high enough breakdown voltage. Proposed technology addresses this problem.

TECHNOLOGY DESCRIPTION

One of the applications explored is active snubber connected in parallel with HVDC thyristor. 8.5kV thyristor are used in the modern LCC valve, therefore device in the active snubber would need to be rated at ~10kV which is not available on the market today. Typical approach to resolve the issue would be to used series connection of lower voltage devices. Present invention proposes an alternative solution.

It is proposed to use a pulse transformer arrangement within an active snubber circuit to reduce the voltage rating of the semiconductor switch device at the expense of the device current rating, as shown in figure. Using this arrangement offers an additional degree of freedom in the adjustment of the voltage across the terminals of the semiconductor switching components, which reduces the restrictions on the choice of these components. For example, it would be possible to use single lower voltage power semiconductor (<600V) for active snubber application alongside the 8.5kV thyristor considered above. Effectively substituting series connection of high power semiconductor devices with pulsed transformer with low voltage semiconductor device connected on the secondary.

The patent main claim is very generic covering general converters and not limiting to HVDC application only. If patent granted unchanged it will cover use of the transformer based snubber for series connected device applications.

APPLICATION DOMAIN

- Series connected devices
- Active snubbers
- HVDC LCC

ADVANTAGES

Low voltage devices can be used within active snubber circuit

Can be applied to any converter using series connected devices

TRL SCALE

1 2 3 4 5 6 7 8 9

DELIVERABLES

PATENT FR2002602

SCIENTIFIC REFERENCE

none