DUAL VOLTAGE AND CURRENT LOOP LINEARIZATION CONTROL AND VOLTAGE BALANCING CONTROL FOR SOLID STATE TRANSFORMER

Abstract

This invention relates to a method of controlling a Solid State Transformer (SST). The method comprises dividing a dual active bridge (DAB) power reference on a Low Voltage (LV) side Direct Current (DC) link voltage to obtain a total DAB reference current; dividing the total DAB current reference by *N* number of DAB modules to obtain a reference current for each DAB module; in response to SST being in a normal power regulation, determining a deviation of a capacitor voltage at the HV side of each of a *k* DAB modules with reference from an average voltage from the HV DC bus; determining a current adjustment signal for each of the *k* DAB modules based on the total DAB reference current and a corresponding deviation of the capacitor voltage of each of the *k* DAB modules; adding a saturated current adjustment signal together with the reference current for each of the *k* DAB modules to obtain a total current reference for each of the *k* DAB modules; and subtracting a sum of the total current reference of each of the *k* DAB modules from the total DAB reference current to determine a total current reference for an N^{th} DAB module.

Figure 7 to accompany the abstract