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ANALYSIS OF MODULAR MULTILEVEL DC/DC CONVERTER WITH FAULT BLOCKING CAPABILITY INTER CONNECTED WITH HVDC SYSTEM USING ANN

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ABSTRACT-A modular multilevel dc/dc converter, named the DC-MMC, that can be conveyed to interconnect HVDC systems of various or comparable voltage levels is presented in this paper. Its key highlights include:
1) bidirectional power stream;
2) advance up and advance down operation; and
3) bidirectional blame blocking like a dc electrical switch.
The bit of the DC-MMC is another class of bidirectional single-arrange dc/dc converters using interleaved strings of fell sub modules. The DC-MMC operation is examined and an open circle voltage control system that guarantees control adjust of each sub module capacitor by means of coursing air conditioning streams is proposed. Here, we are utilizing the Ann controller. Simulated neuron should emulate the activity of a natural neuron, i.e., to acknowledge a wide range of signs, xi, from many neighboring neurons and to process them in a pre-characterized straightforward way. The objective of the neural system is to tackle issues similarly that the human cerebrum would, albeit a few neural systems are significantly more conceptual. Present day neural system extends regularly work with a couple of thousand to a couple of million neural units and a great many associations, which is as yet a few requests of greatness less perplexing than the human mind and nearer to the registering energy of a worm. Reproductions played out the DC-MMC's guideline of operation and the proposed control procedure. By utilizing the reenactment comes about we can examine the single-arrange dc/dc transformation process for both advance down and advance up operating modes.

IndexTerms— Converters, ANN, dc-dc power conversion, HVDC converters, multilevel systems.

I. INTRODUCTION

The dc/ac standard structure convertor (MMC) has increased across the board quality in light of its few operational advantages for top voltage and high power applications. DC transmission is slash cleave transforming into a most mainstream

elective for the largescale reconciliation of sustainable power sources. A substitution classification of standard development bidirectional dc/dc converters upheld the MMC thought have as of late been proposed. These converters, named the DC-MMC, can achieve single-organize dc/dc transformation utilizing arrangement fell SMs. Most eminently, its potential favorable circumstances for matrix connection of seaward breeze ranches are notable. because of this dynamic electrical scene, the advancement of dc networks for the social event anddistribution of vitality from inexhaustible sources is picking up footing. This paper proposes a standard multilevel dc/dc converter, named the DC-MMC, that can possibly interconnect HVDC systems of either very surprising or comparable voltage levels though in the meantime giving the guarantee of bidirectional blame piece. The DC-MMC utilizes different interleaved strings of fell SMs to perform single-organize bidirectional dc/dc change, and is able to do every lessening and increment operation. Disposal of the standard middle air conditioning join is accomplished by misusing current air conditioning streams to deal with control adjust of each SM capacitance. the use of 2 fell dc/air conditioning stages is costly and ruins general transformation power though electrical gadget less dc/dc converters ar more often than not totally standard and might experience the ill effects of uncontrolled engendering of blame streams [26] on account of outside dc shortcomings. Because of its standard structure and bunches of operational advantages, the notable particular multilevel convertor (MMC) has turned into a most mainstream determination for dc/air conditioning change in shifted control matrix applications.

The MMC is particularly captivating to be utilized as a part of HVDC transmission wherever its ascendable plan grants gigantic agent voltages to be acknowledged by just stacking the imperative assortment of sub modules (SMs) in course. Notwithstanding, the most weakness of MMC-based dc/dc topologies is that they require 2 fell dc/air conditioning change stages. this can be a similarly costly answer as each dc/air conditioning stage should technique an equal information control, prompting poor use of aggregate put in SM rating. In addition, the characteristic might want for A halfway air conditioning join and electrical gadget evaluated for the entire information control all the more antagonistically impacts the full esteem comparatively as general change strength. The DC-MMC additionally offers propelled alternatives, for example, buck/help capacity and dc electrical circuit ability. despite the fact that the possibility of HVDC-based frameworks offers a few focal points, one among the rule challenges confronting their broad arrangement is that the interconnection of different dc systems and administration of energy streams betweenthem. To suit every capacity, bidirectional dc/dc converters will be dispatched (albeit elective gadgets custom fitted for control stream control exist. By utilizing dc/dc converters to direct line voltages, or the voltage between entirely unexpected system fragments, the capacity

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controllability among dc lattices will be extended

MODELING OF PROPOSED THEORY

II. PROPOSED DC-MMC FOR HVDC INTERCONNECTS

A. Three-String Architecture

The DC-MMC performs single-stage dc/dc conversion by utilizing interleaved strings of cascaded SMs. Fig. 1(a) shows the three-string architecture of the DC-MMC for deployment in bipolar HVDC networks. Each string is comprised of two pairs of arms; each pair of arms consisting of an inner arm and an outer arm, where an arm is defined as a set of cascaded SMs.

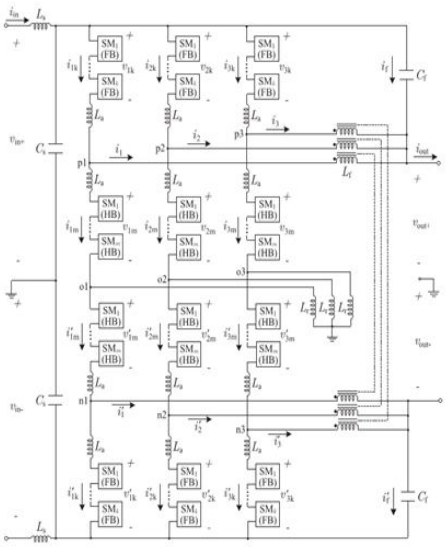

Fig.1. Three-string DC-MMC architecture with input and output filtering

III. ANALYSIS OF DC-MMC OPERATION

Based on the analysis, a modulation scheme for the ac arms voltages that satisfies SM capacitor power balance for all possible operating modes is proposed. The DC-MMC operation in greater depth, by utilizing a simplified string model to study the ideal single-stage dc/dc conversion process. Unless otherwise indicated, the following assumptions are enforced:

1) each arm has a large number of SMs such that ideal sinusoidal ac voltages are synthesized;

2) ac voltages and currents are represented by their steady-state fundamental frequency components;

3) resistance terms are neglected; and

4) ac output filter currents are negligible.

IV. BIDIRECTIONAL DC FAULT BLOCKING CAPABILITY

In addition to enabling step-up operation and the interconnection of HVDC networks with similar voltage levels, the FB/SMs in Figs. 1 and 2 can provide bidirectional fault blocking. That is, the DCMMC can interrupt fault currents initiated by dc faults in either the input or output side networks similar to a dc circuit breaker. This is accomplished by controlling the FB/SMs in Figs. 1 and 2 to impose the appropriate polarity of voltage.

V. OPEN LOOP VOLTAGE CONTROL AND SIMULATION RESULTS

Open loop control techniques for balancing of SM capacitor voltages within the dc/ac MMC have been discussed in several papers. One of the simplest forms of open loop control, direct modulation adopts fixed sinusoidal modulating signals for the MMC arms. Balancing of SM capacitor voltages is achieved by a sort and selection algorithm that arranges capacitors based on their voltage measurements, and inserts the appropriate one(s) at each switching instant based on arm current measurements.

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VI.ARTIFICIAL NEURAL NETWORK

ANN is nonlinear model that is easy to use and understand compared to statistical methods. ANN is non-parametric model while most of statistical methods are parametric model that need higher background of statistic. ANN with Back propagation (BP) learning algorithm is widely used in solving various classification and forecasting problems. Even though BP convergence is slow but it is guaranteed. However, ANN is black box learning approach, cannot interpret relationship between input and output and cannot deal with uncertainties. To overcome this several approaches have been combined with ANN such as feature selection and etc.

VII.CONCLUSION

The DC-MMC is another class of secluded multilevel dc/dc converters appropriate for HVDC framework utilizing ANN is proposed in this paper. This paper shows the main dynamic model for the DCMMC. The proposed state-space display is approved by contrasting and reproduction comes about for a far reaching exchanged model. Another particular multilevel dc/dc converter, named the DC MMC, is exhibited for the interconnection of bipolar HVDC systems. The fundamental favorable circumstances of utilizing Artificial Neural Networks (ANN) include: it can deal with expansive measure of informational indexes; it can verifiably identify complex nonlinear connections amongst needy and free factors; it has capacity to recognize every single conceivable collaboration between indicator factors; and so forth. The proposed state-space demonstrate is approved by contrasting and recreation comes about for an exhaustive exchanged model. The DC-MMC highlights another class of bidirectional single-arrange dc/dc converters using interleaved strings of fell SMs. By utilizing an extraordinary course of action of HB/SMs and FB/SMs for each string, the DC MMC can give both advance up and venture down operations and interconnect HVDC systems of comparative voltage levels. To guarantee capacitor voltages are controlled to their ostensible esteems the DC-MMC needs some type of direction for the air conditioner normal power trade between converter arms. This direction is accomplished by means of shut circle control of the inside coursing air conditioning streams. A rearranged model of the converter strings is introduced and the perfect dc/dc change process is broke down in this paper. An open circle voltage control conspire is proposed for the single string and two-string structures that embraces shut circle air conditioning current control to keep up control adjust of the SM capacitors. To guarantee capacitor voltages are managed to their ostensible esteems the DC-MMC needs some type of direction for the air conditioner normal power trade between converter arms. To make up for load and parameter awkward nature the reproduction comes about approve the proposed technique. The proposed plot has the advantages of limiting the circulating ac currents needed for the dc/dc conversion process while significantly reducing the installed circuit reactance

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