IJARES/November 2015/Volume-3/Issue-11/2180-2186 **ISSN 2347- 9337**

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN ENGINEERING AND SCIENCE

INTRODUCTION TOWARDS SCALABLE APPROACH FOR LARGE POWER CONVERTERS

B. Naveen [1], L.Uday Kiran [2], P.Purna Chandrarao [3]

[1]M.Tech Student, Dept of EEE, Chalapathi Institute of Technology, Guntur, A.P, India

[2]Assistant Professor, Dept of EEE, Chalapathi Institute of Technology, Guntur, A.P, India

[3] Head Dept of EEE, Chalapathi Institute of Technology, Guntur, A.P, India

ABSTRACT:

A novel type of converter control was developed, appropriate to multilevel high-voltage direct current methods with two or else more twelve-pulse groups per terminal. Self commutating rejection of multilevel current is a possible option towards conventional high-voltage direct current technology. Disadvantage of multilevel configurations is interdependence of reactive power injections at both of the link ends. The proposed scheme is on basis of usage of controllable shift among firings of two twelve-pulse groups within opposite directions, a novel concept that offer self-determining reactive power control at sending as well as receiving ends. In multi-level current source converters, high-voltage direct current interconnections by two twelve pulse groups for each terminal same current waveform is created by each of twelve-pulse converter groups, and as a result entire output current waveform will be similar when phase-shift is set up among firings of two groups that constitute converter station.

Keywords: Multilevel high-voltage direct current, Twelve-pulse converter, Phase-shift, Controllable shift.

1. INTRODUCTION:

Pulse width modulation has been preferred as a choice for self-commutation high-voltage direct current transmission of medium power. On the other hand, this knowledge is less suitable to huge power ratings as well as long distances, because of superior switching losses and to rating limits of its major components [1]. The exchange of huge quantities of power among separate power systems as well as transmission of power from distant generating stations is on basis of principle of line commutated conversion of current source. Pulse width modulation will offer totally independent controllability of converter voltages on both sides of link and this ability is not obtainable to multilevel configurations under present control schemes. Our work will introduce a novel view that is appropriate to huge power converters that includes two series- linked twelve-pulse groups. The proposed system is on the basis of usage of controllable shift among firings of two twelve-pulse groups within opposite directions, a novel concept that offer self-determining reactive power control at sending as well as receiving ends. On the other hand the usage of pulse width modulation is at present restricted to three levels and is just used in the schemes of voltage source conversion.

2. METHODOLOGY:

Multilevel configurations of voltage source converter were presented as promising alternatives to pulse width modulation-voltage source converter transmission; however their structural difficulty has been most important problem to their commercial execution [2][3]. The latest proposal, of multilevel current reinjection perception makes simplification of converter arrangement and allows constant usage of conventional thyristors for major converter bridges. Our work will introduce a novel view that is appropriate to huge power converters that includes two series-linked twelve-pulse groups. It has been revealed using a multilevel current reinjection configuration, that usage of controllable shift among firings of series associated converter group's will permit autonomous reactive power control at the two dc link terminals. This will offer four quadrant power controllability towards multilevel current source high-voltage direct current transmission and consequently, makes this choice equally flexible to Pulse width modulation–conversion of controlled

voltage source, devoid of latter's limits regarding power as well as voltage ratings. It can be expected that multilevel current reinjection which is, combined with firing-shift control, have to compete favourably by conventional current source expertise for extremely huge power applications. In multilevel current source converters high-voltage direct current interconnections by two twelve pulse groups for each terminal same current waveform is created by each of twelve-pulse converter groups, and as a result entire output current waveform will be similar when phase-shift is set up among firings of two groups that constitute converter station. Self-commutating multilevel current reinjection is a possible option towards conventional high-voltage direct current thyristor technology. An essential disadvantage of multilevel configurations is interdependence of reactive power injections at both of the link ends. Multilevel configurations were presented as promising alternatives to pulse width modulation voltage source converter transmission; however their structural difficulty has been most important problem to their commercial execution. The most important benefit of self above natural commutation within high-voltage direct current transmission is capacity to manage separately reactive power at every link end, a property which cannot be attained by multilevel current reinjection -basis configuration during usage of one double-bridge converter group.

3. AN OVERVIEW OF PROPOSED SYSTEM:

Multilevel current reinjection outlook makes simplification of converter arrangement and allows constant usage of conventional thyristors for major converter bridges. We introduce a novel view that is appropriate to huge power converters that includes two series- linked twelve-pulse groups. It is on the basis of usage of controllable shift among firings of two twelve-pulse groups within opposite directions, a novel concept that offer self-determining reactive power control at sending as well as receiving ends. Interconnections of huge power ratings will usually make use of two or else more twelve-pulse converter groups and these are controlled separately from each other devoid of influencing output voltage waveform [4]. When functioning condition at one end of link modify reactive power balance at this end, firings of two groups at other end are altered regarding each other within opposite

directions to maintain power factor stable. The exchange of reactive power among the converter as well as ac system is determined by sine of firing angle. Shifting has an instant effect on dc voltage level and, hence to preserve particular dc power transfer all the way through the link, an equivalent transform of firing angle have to be made at other end, which consecutively have an effect on reactive power exchange by ac system. Therefore, in conventional converter control, reactive powers that are injected at two ends of multilevel current source converters links are mutually dependent. In multilevel current source converters high-voltage direct current interconnections by two twelve pulse groups for each terminal same current waveform is created by each of twelve-pulse converter groups, and as a result entire output current waveform will be similar when phase-shift is set up among firings of two groups that constitute converter station. When a transform of functioning conditions at receiving end requires additional reactive power from converter, and as a result decrease dc voltage, changing firings of two sending end converter groups within opposite directions and offer necessary dc-voltage reduction, whereas maintaining reactive power stable. A comparatively minute change of active power is caused by difference of basic current that is produced by shift; however this change is compensated by means of a minute additional correction of two firing angles. For a converter to function in firing-shift mode, the firing instant of one group is reserved on positive side, whereas second group might function as a source or else sink of reactive power. For total flexibility sending end requires to manage real as well as reactive power and receiving end maintain converter dc voltage stable as well as control reactive power. By reactive power control at both ends, controllers are simply be configured for best possible power transfer at system level based on operating objectives, that involves provision of stable power factor at sending end as well as stable ac terminal voltage at receiving end [5]. To manage the actual as well as reactive power over total operating range converter response requires being linear. Standard proportional-integral-derivative controllers are unsuitable for this application since their gain is static, and even though they might provide suitable performance above a narrow band, latter is not suitable above complete range.

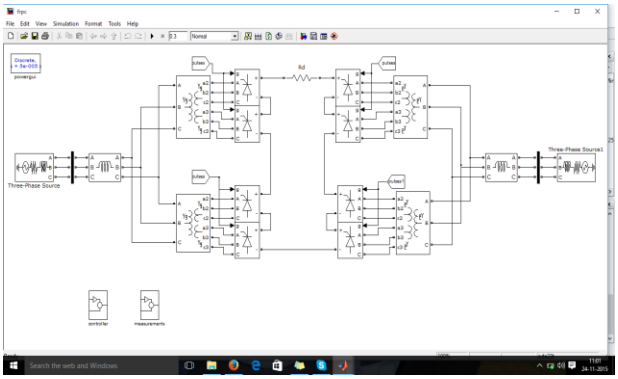

Fig 1: Proposed Configuration of HVDC Links

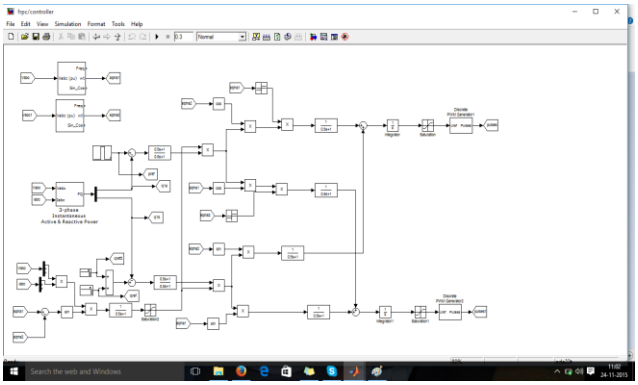

Fig 2: Proposed Active and Reactive Power Controller

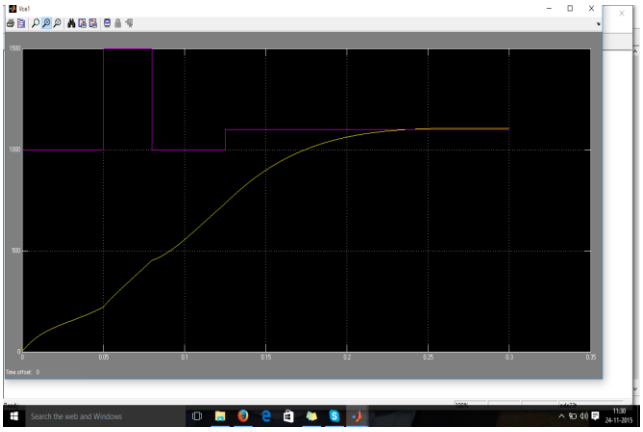

Fig 3: Active Power and Ref Active Power of Proposed Converter

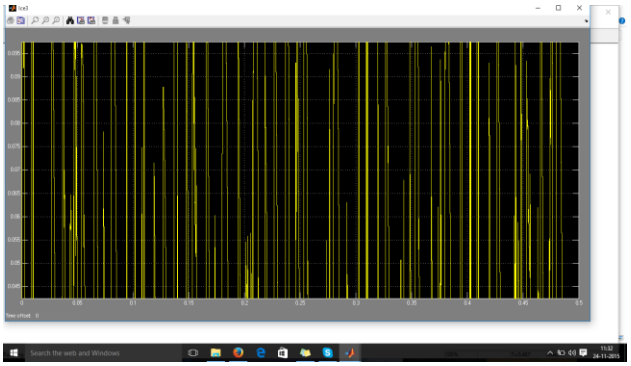

Fig 3: i dc

Fig 4: active power 2

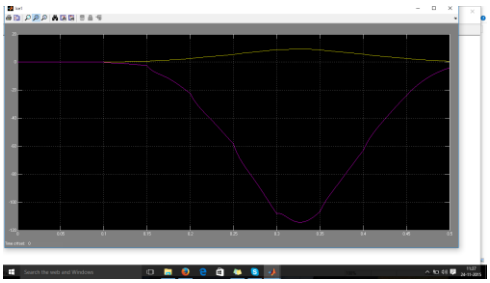

Fig 5: reactive power ref 2 and actual

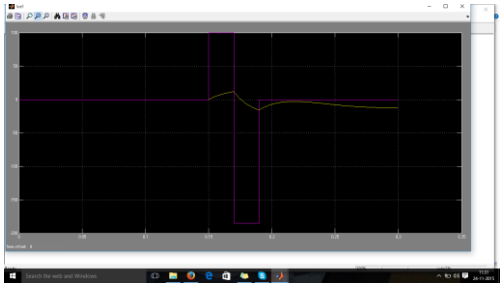

Fig 6: reactive power ref and act

4. CONCLUSION:

Multi-level configurations of voltage source converter were obtainable as promising alternatives to pulse width modulation, voltage source converter transmission; on the other hand their structural difficulty has been most important problem to their commercial execution. A new converter control was developed, appropriate to multilevel high-voltage direct current methods with two or else more twelve-pulse groups per terminal. The system is on basis of usage of controllable shift among firings of two twelve-pulse groups within opposite directions, a novel concept that offer self-determining reactive power control at sending as well as receiving ends. Interconnections of enormous power ratings will typically make use of two or else more twelve-pulse converter groups and these are controlled separately from each other devoid of influencing output voltage waveform. In multi-level current source converters high-voltage direct current interconnections by two twelve pulse groups for each terminal same current waveform is created by each of twelve-pulse converter groups, and as a result entire output current waveform will be similar when phase-shift is set up among firings of two groups that constitute converter station.

REFERENCES

[1] Cigre SC-4 WG 37, VSC Transmission Final document. Paris, France, 2004.

[2] G. Jung et al., "A general circuit topology of multilevel inverter," in Proc. IEEE Power Electronics Specialist Conf., 1991, vol. PESC 91 Rec., pp. 96–103, Mass. Inst. Technol.

[3] G. Asplund, K. Eriksson, and K. Svensson, "DC transmission based on voltage source converters," presented at the CIGRE SC Colloq., Johannesburg, South Africa, 1977.

[4] L. B. Perera, N. R. Watson, Y.-H. Liu, and J. Arrillaga, "Multi-level current reinjection self-commutated HVDC converter," Proc. Inst. Elect. Eng., Gen., Transm. Distrib., vol. V152, no. 5, pp. 607–615, Sep. 2005.

[5] J. Arrillaga, Y. H. Liu, L. B. Perera, and N. R. Watson, "A current reinjection scheme that adds self-commutation and pulse multiplication to the thyristor converter," IEEE Trans. Power Del., vol. 21, no. 3, pp. 1593–1599, Jul. 2006.

B. Naveen graduated in B.Tech EEE from Nalanda Institute of Engineering & Technology, Guntur Dist...Andhra Pradesh.

L.Uday Kiran (Assistant Professor)

Mobile No: 9293333329

Email Id: udaysriram@gmail.com

P.Purna Chandrarao,EEE HOD

Mobile No: 9866257105

Email Id: chandu.podila@gmail.com