MODELLING AND SIMULATION OF MATRIX CONVERTER FOR DC CHOPPER IMPLEMENTATION

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RAHIMAH BINTI UZIR
2001474839
B. ENG (Hons.) ELECTRICAL
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA (UiTM)
Shah Alam, Selangor Darul Ehsan

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CHAPTER 1

INTRODUCTION

1.1 Background Of The Project

The matrix converter is an advanced circuit topology capable of converting ac to ac, ac to dc, and dc to ac and dc-to-dc. Matrix converters offer many advantages over traditional topologies, such as the ability to regenerate energy back to the utility. The size of the converters can also be reduced since there are no large reactive components for energy storage [1].

In matrix converters the switching algorithm need to be carefully calculated to ensure that the switches do not short circuit the voltages sources, and do not open circuit the current sources, thus the continuous current at the output terminal are needed. It also follows; if the number of the input-phases are equal to or less than the number of output phases, then the continuous current must available at the input terminal the advantages of this approach, it can be developed to any kind of matrix converters [1]. The four main form of power conversion in power electronic include:

i. AC to DC conversion
ii. AC to AC conversion
iii. DC to DC conversion
iv. DC to AC conversion

The basic configuration of matrix converter includes a nine matrix that uses four-quadrant switch. Each four-quadrant switch resembles a full-bridge inverter and can assume three voltage levels during conduction [2].

In this work a direct dc-to-dc converters were presented to operate as a variable dc voltage from a fix dc voltage with the simulation and modelling presented using Power System Blockset within MATLAB/Simulink and Pspice simulation technique.