

**STUDY OF PASSIVE FILTER FOR APPLICATION ON THE
SINGLE-PHASE MATRIX CONVERTER (SPMC) OPERATE AS AC
CHOPPER**

Thesis is presented in partial fulfillment for the award of the Bachelor of Electrical
Engineering (Hons.)



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ABSTRACT

This paper presents the application of single phase matrix converter (SPMC) as AC chopper by using different type passive filter designs. MATLAB/simulink will be use to develop the simulation model of the SPMC without and with filter and to study the behavior of the proposed converter. Sinusoidal pulse width modulation (SPWM) is used for a switching technique. Safe commutation was developed to avoid voltage spikes. To avoid this kind of problem, filter design represented by low pass RL filter and LC filter. Results of simulation are presented to verify the proposed technique is feasible. The circuit is fed from 50V (rms) and 50Hz supplying a passive R load.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Power electronic refers to control and conversion of electrical power semiconductor device where the device is operating as switches. Power electronic has applications that span the whole field of electrical power system.

Matrix converter is an advanced topology that could perform many different converter functions. SPMC is used to step-up frequency, transformation and rectification. The single phase input and output are connecting with four bidirectional switches at the intersection. This topology capable of converting:

1. AC to AC
2. AC to DC
3. DC to AC
4. DC to DC

The basic of matrix converter are from a special class of Cycloconverter that was developed in the early 1930s [1]. In 1976, the ac-ac matrix converter topology was first investigated [2]. Venturini and Alessina was introduced three-phase matrix converter (TPMC) in 1980. Obviously deal with three-phase circuit topology, control and protection. Zuckerberger was first realized that the single-phase variant denoted as SPMC [3].