

Abstract

The first synthesizers worked with analog circuits, and because of the high price of the technology, the options were few. In 1970s, by the development of digital technology, synthesizers based on abstract algorithms have become popular. Compared to analog techniques, these devices were cheaper, and with the calculations of the built in processor, the possibilities of sound synthesis methods increased and they were more reliable. FM sound synthesis was one of the most popular abstract method for sound synthesis, with its simple algorithm and characteristic sound. In the 1990s, the FM synthesis based chips were implemented in many audio cards used in computers. One of these chips was the OPL3.

Nowadays, with the further progress in technology, composers work with studio software. There is still a need to emulate older technologies in their software, and the topic of this thesis is about the implementation of FM synthesis as a software plugin.

The first chapter of my thesis describes the abstract algorithms, the Karplus-Strong, waveshaping and the FM sound synthesis methods. The next chapter describes the properties of the OPL3 chip, with its waveforms and oscillator connections. The third chapter shows the MATLAB simulation of the OPL3 sound chip. In the fourth chapter, all the used programs and software libraries are outlined that are used for the development of VST plugin. The fifth chapter describes the C++ software classes and compares the C++ implementation with the MATLAB simulations. The sixth chapter compares other FM based plugins with the plugin developed in this work.