

# Table of Contents

<b>Table of Contents</b>	<b>v</b>
<b>Abstract</b>	<b>vii</b>
<b>Acknowledgements</b>	<b>viii</b>
<b>Introduction</b>	<b>1</b>
<b>1 Mathematical Background</b>	<b>3</b>
1.1 Primary Modules and Primary Decomposition . . . . .	3
1.2 Primary decomposition using the method of Gianni, Trager and Zacharias	8
1.3 The Methods of Eisenbud, Huneke and Vasconcelos . . . . .	14
1.3.1 The Equidimensional Hull of a Submodule . . . . .	14
1.3.2 Localizations and Primary Decomposition . . . . .	16
<b>2 On Parallelization of Modular Algorithms</b>	<b>22</b>
2.1 Computing Gröbner bases with modular methods . . . . .	23
2.2 A modular approach to primary decomposition . . . . .	28
2.3 Examples and timings . . . . .	32
<b>3 Shomoyama and Yokoyama Method for Primary Decomposition</b>	<b>36</b>
3.1 Localization . . . . .	36
3.2 Pseudo Primary Decomposition and Extraction . . . . .	37
3.3 Criteria For Redundant Components . . . . .	43
3.4 The Primary Decomposition Procedure . . . . .	46
3.5 Pseudo Primary Decomposition . . . . .	48
3.6 Extraction On A Pseudo Primary Submodule . . . . .	50
3.7 Termination of the Procedure . . . . .	52

Appendix	61
Bibliography	71