

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Motivation . . . . .	2
1.2	Background . . . . .	6
1.3	Objectives . . . . .	9
1.4	Employed method . . . . .	10
1.5	Thesis outline . . . . .	11
	Chapter 1 References . . . . .	18
<b>2</b>	<b>Contributions to a quasi-two-dimensional radial turbine model</b>	<b>19</b>
2.1	Introduction . . . . .	20
2.2	Model description and method of calculation . . . . .	21
2.3	Calibration method . . . . .	27
2.4	Experimental setup . . . . .	31
2.5	Results . . . . .	38
2.6	Conclusions . . . . .	48
	Chapter 2 References . . . . .	54
<b>3</b>	<b>An experimental method to test two-scroll turbines under non-linear pulse conditions</b>	<b>55</b>
3.1	Introduction . . . . .	56
3.2	Experimental method description . . . . .	58
3.3	Results and discussion . . . . .	66
3.4	Conclusions . . . . .	84
	Chapter 3 References . . . . .	88
<b>4</b>	<b>One dimensional twin-entry radial turbine model for non-linear pulse simulations</b>	<b>89</b>
4.1	Introduction . . . . .	90
4.2	Model description and quasi-steady adaptation . . . . .	96
4.3	Validation of the model . . . . .	100
4.4	Conclusions . . . . .	122
	Chapter 4 References . . . . .	128
<b>5</b>	<b>A fast 1D model for turbine sound and noise characterisation</b>	<b>129</b>
5.1	Introduction . . . . .	130
5.2	Method description and acoustic matrices generation . . . . .	131
5.3	Model validation and sensitivity study . . . . .	139
5.4	Model adaptation for twin-entry turbine . . . . .	159
5.5	Conclusions . . . . .	168

Chapter 5 References . . . . .	174
<b>6 Concluding remarks</b>	<b>175</b>
6.1 Introduction . . . . .	176
6.2 Main contributions . . . . .	176
6.3 Limitations . . . . .	180
6.4 Suggestions for future studies . . . . .	181
Chapter 6 References . . . . .	183
<b>Global references</b>	<b>185</b>