

# Study for the numerical resolution of conservation equations of mass, momentum and energy to be applied to solar thermal collectors

**Bachelor's thesis**  
**Annex E: Project planning**

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# Contents

1 Project planning

2

# List of Figures

1.0.1	Temporal distribution of tasks . . . . .	3
1.0.2	Gantt chart . . . . .	5

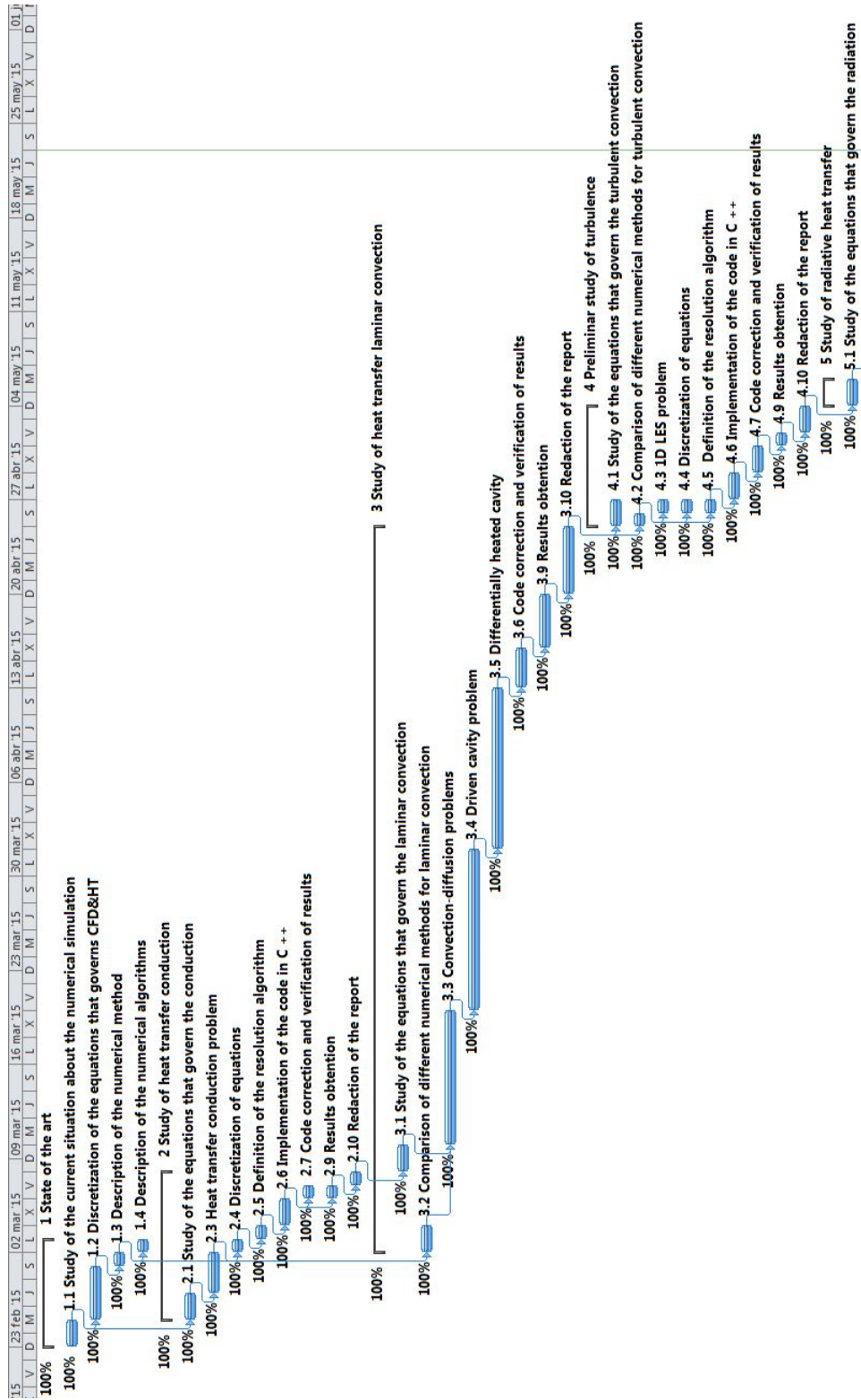
# 1 Project planning

This chapter places in time all the tasks that have been made in this project as well as the relationship between them using a Gantt chart.

Nombre de tarea	Duración	Comienzo	Fin	Predece
<b>1 State of the art</b>	<b>8 días</b>	<b>lun 23/02/15</b>	<b>lun 02/03/15</b>	
1.1 Study of the current situation about the numerical simulation	2 días	lun 23/02/15	mar 24/02/15	
1.2 Discretization of the equations that governs CFD&HT	4 días	mié 25/02/15	sáb 28/02/15	2
1.3 Description of the numerical method	1 día	dom 01/03/15	dom 01/03/15	3
1.4 Description of the numerical algorithms	1 día	lun 02/03/15	lun 02/03/15	4
<b>2 Study of heat transfer conduction</b>	<b>11 días</b>	<b>mié 25/02/15</b>	<b>sáb 07/03/15</b>	
2.1 Study of the equations that govern the conduction	2 días	mié 25/02/15	jue 26/02/15	2
2.3 Heat transfer conduction problem	3 días	vie 27/02/15	dom 01/03/15	7
2.4 Discretization of equations	1 día	lun 02/03/15	lun 02/03/15	8
2.5 Definition of the resolution algorithm	1 día	mar 03/03/15	mar 03/03/15	9
2.6 Implementation of the code in C ++	2 días	mié 04/03/15	jue 05/03/15	10
2.7 Code correction and verification of results	1 día	vie 06/03/15	vie 06/03/15	11
2.9 Results obtention	1 día	vie 06/03/15	vie 06/03/15	11
2.10 Redaction of the report	1 día	sáb 07/03/15	sáb 07/03/15	13
<b>3 Study of heat transfer laminar convection</b>	<b>54 días</b>	<b>lun 02/03/15</b>	<b>vie 24/04/15</b>	
3.1 Study of the equations that govern the laminar convection	2 días	dom 08/03/15	lun 09/03/15	14
3.2 Comparison of different numerical methods for laminar convection	2 días	lun 02/03/15	mar 03/03/15	4
3.3 Convection-diffusion problems	10 días	mar 10/03/15	jue 19/03/15	17;16
3.4 Driven cavity problem	12 días	vie 20/03/15	mar 31/03/15	18
3.5 Differentially heated cavity	12 días	mié 01/04/15	dom 12/04/15	19
3.6 Code correction and verification of results	3 días	lun 13/04/15	mié 15/04/15	20
3.9 Results obtention	4 días	jue 16/04/15	dom 19/04/15	21
3.10 Redaction of the report	5 días	lun 20/04/15	vie 24/04/15	22

<b>4 Preliminar study of turbulence</b>	<b>9 días</b>	<b>sáb 25/04/15</b>	<b>dom 03/05/15</b>	
4.1 Study of the equations that govern the turbulent convection	2 días	sáb 25/04/15	dom 26/04/15	23
4.2 Comparison of different numerical methods for turbulent convection	1 día	sáb 25/04/15	sáb 25/04/15	23
4.3 1D LES problem	1 día	dom 26/04/15	dom 26/04/15	26
4.4 Discretization of equations	1 día	dom 26/04/15	dom 26/04/15	26
4.5 Definition of the resolution algorithm	1 día	dom 26/04/15	dom 26/04/15	26
4.6 Implementation of the code in C ++	2 días	lun 27/04/15	mar 28/04/15	29
4.7 Code correction and verification of results	2 días	mié 29/04/15	jue 30/04/15	30
4.9 Results obtention	1 día	vie 01/05/15	vie 01/05/15	31
4.10 Redaction of the report	2 días	sáb 02/05/15	dom 03/05/15	32
<b>5 Study of radiative heat transfer</b>	<b>2 días</b>	<b>lun 04/05/15</b>	<b>mar 05/05/15</b>	
5.1 Study of the equations that govern the radiation	2 días	lun 04/05/15	mar 05/05/15	33
<b>6 Inclined air layers</b>	<b>30 días</b>	<b>mié 06/05/15</b>	<b>jue 04/06/15</b>	
6.1 Study of the equations that govern the thermal problem	4 días	mié 06/05/15	sáb 09/05/15	35
6.2 Discretization of equations	5 días	dom 10/05/15	jue 14/05/15	37
6.3 Definition of the resolution algorithm	2 días	vie 15/05/15	sáb 16/05/15	38
6.4 Implementation of the code in C ++	6 días	dom 17/05/15	vie 22/05/15	39
6.5 Code correction and verification of results from experimental data	13 días	sáb 23/05/15	jue 04/06/15	40
6.6 Results obtention	13 días	sáb 23/05/15	jue 04/06/15	40
6.7 Redaction of the report	13 días	sáb 23/05/15	jue 04/06/15	40
6.8 Redaction of the conclusions	13 días	sáb 23/05/15	jue 04/06/15	40
6.9 Drafting enhancements and future actions	13 días	sáb 23/05/15	jue 04/06/15	40
<b>7 Feasibility study</b>	<b>3 días</b>	<b>sáb 23/05/15</b>	<b>lun 25/05/15</b>	
7.1 Project budget	3 días	sáb 23/05/15	lun 25/05/15	40
7.2 Environmental study	3 días	sáb 23/05/15	lun 25/05/15	40
<b>8 Presentation</b>	<b>10 días</b>	<b>sáb 13/06/15</b>	<b>lun 22/06/15</b>	
8.1 Creation of presentation	3 días	sáb 13/06/15	lun 15/06/15	
8.2 Presentation assay	6 días	mar 16/06/15	dom 21/06/15	50
8.3 Explanation of the study	1 día	lun 22/06/15	lun 22/06/15	51
Drafting of the Project Charter	4 días	mar 03/03/15	vie 06/03/15	
Drafting of the first monitoring report	2 días	jue 19/03/15	vie 20/03/15	
Drafting of the second monitoring report	2 días	jue 09/04/15	vie 10/04/15	
Drafting of the third monitoring report	2 días	jue 30/04/15	vie 01/05/15	
Delivery of the draft	1 día	vie 29/05/15	vie 29/05/15	
Delivery of the qualit report	1 día	vie 29/05/15	vie 29/05/15	
Final delivery of TFG	1 día	vie 12/06/15	vie 12/06/15	

Figure 1.0.1: Temporal distribution of tasks





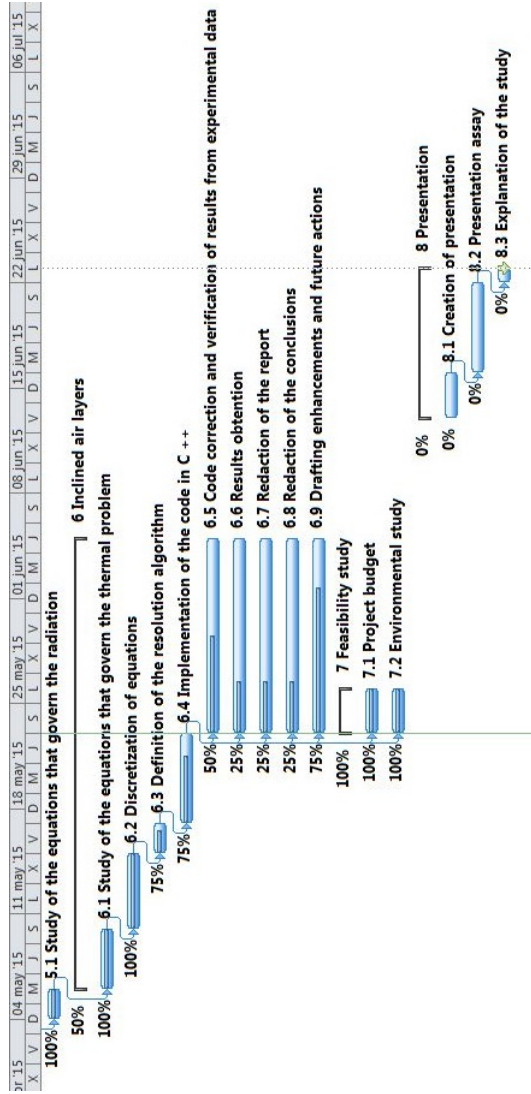


Figure 1.0.2: Gantt chart