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Study of the control for the recovery of a rocket's launch system

Document:

Budget

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BACHELOR FINAL THESIS

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1 Budget

This document presents the costs of the development of the project, which involves the engineering hours and the software, equipment and energy costs. In this case, the project has neither material expenses nor a product price, since it is just centred in a study through simulations.

1.1 Engineering hours

In order to calculate the overall costs associated in the work hours, the computation of the hours dedicated to each group of tasks is effectuated and, since the project is developed by an engineering student, a cost of 15 €/h is considered.

1.2 Software cost

The different employed software can be listed below:

- MATLAB

The Matlab license for academic use is priced at 250 € per year and the corresponding to 4 months, which is the time duration of the project, is accounted.

- L^AT_EX

The L^AT_EX license is free of charge due to the *Overleaf* free plan.

- *Microsoft Office*

The annual license of *Microsoft Office* costs 69 € and the corresponding to 2 month, which is the period destined to the *PowerPoint* presentation preparation, is assumed.

1.3 Equipment cost

The used laptop in this thesis is the MacBook Pro, with a purchase price of 1800 € in 2017, and, considering that within these 4 years it has been devalued to 1200 €, the amortization would result in 150 €/year. Hence, estimating a use of 40 h/week, an hourly rate of 0.072 €/h would be obtained.

1.4 Energy cost

The energy cost involves the electricity consumption of the laptop, which requires a power supply of 61 W, and its mean cost is about 0.11 €/kWh. Moreover, taking into account the overall duration of the project of 455 h, the total power consumption is estimated to be 27.76 kWh.

1.5 Total cost

Finally, the total cost can be summarized with the previous detailed expenses.

Table 1: Breakdown costs of the project

Budget			
Engineering hours			
Group of tasks	Duration (h)	Price per hour (€/h)	Total (€)
Project introduction	35	15.00	525.00
Model	130	15.00	1950.00
Control	130	15.00	1950.00
Comparison of the control systems	30	15.00	450.00
Results presentation	130	15.00	1950.00
Subtotal			6,825.00
Software			
License	Duration (months)	Price per year (€/year)	Total (€)
Matlab (Academic)	4	250.00	83.33
L ^A T _E X(<i>Overleaf</i>)	4	0.00	0.00
<i>Microsoft Office</i>	2	69.00	11.50
Subtotal			94.83
Equipment			
Concept	Duration (h)	Price per hour (€/h)	Total (€)
Laptop	455	0.072	32.76
Subtotal			32.76
Energy			
Concept	Power consumption (kWh)	Price per hour (€/kWh)	Total (€)
Electricity	27.76	0.11	3.05
Subtotal			3.05
Total			6,955.64 €