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Aeroelastic Study of the Flutter Conditions of an Aircraft Wing

Document:

Budget

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BACHELOR FINAL THESIS



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1. Budget

As the project consists of a computational study the costs considered are only human, machinery, programming and electric.

1.1 Human Cost

Human cost is associated to the total number of hours worked. The mean price per hour is chosen to be 15€.

Table 1 Amount of hours worked for each package in the Project Charter with their equivalent in euros.

Work Package	Hours (h)	Cost per Hour (€/h)	Amount (€)
Gathering Information	34	15	510
Code Testing	68		1020
Program Writing	103		1545
Deliverables & Presentation	137		2055
TOTAL	342	-	5130

1.2 Machinery Cost

Machinery cost considers devices such as the laptop and other digital devices used.

Table 2 Digital equipment used to develop the work with their actual value accounting for amortization.

Digital Device	Cost (€)	Time Used (months)	Amortization (€)	Amount (€)
Laptop	750	36	300	450
Computer Screen	180	12	35	145
HDMI Cable	10	6	-	10
TOTAL	-	-	-	605

1.3 Programs Cost

Programs cost refers to the programs used to achieve the results, communicate with the tutors and write the documents.

Table 3 Programs used and their annual pricing.

Computer Program	Annual License Cost (€/yr)	Time Used (months)	Time Used (yr)	Amount (€)
Overleaf [1]	0			0
Matlab [2]	250	4.5	0.375	93.75
G-Suite Google	0			0
TOTAL	-	-	-	93.75

The amortization is computed considering the estimated useful life of the devices and the residual value of them at the end of their lifespan. The laptop is considered to have a residual value of 150€ after 6 years of use while the screen, after 4 years, will have a residual cost of 40€.

1.4 Electric Cost

Electric cost computes the price of the consumption of electricity during the development phase.

Considering a mean cost of 0.2460€/kWh¹ and a total consumption including the additional screen of 100W/h the cost of electricity gives

$$0.2460\text{€/kWh} \cdot 100\text{W/h} \cdot 1\text{kW}/1000\text{W} \cdot 342\text{h} = 8.41\text{€} \quad (1)$$

In this section, the WiFi connection can be added. Considering a monthly cost of 48.28€[4], after 4.5 months working, the price reaches 217.26€.

1.5 Total Cost

Finally, the total cost is the sum of all the costs considered, being in this case the human, the machinery, the programming and the electric.

¹Cost of June 16, according to [3].

Table 4 Sum of all the previous costs, accounting for the total money that derives from this work.

Type of Cost	Amount (€)
Human	5130
Machinery	605
Programs	93.75
Electric	225.67
TOTAL	6054.42



References

1. OVERLEAF. *Plans and Pricing*. 2022. Available also from: <https://www.overleaf.com/user/subscription/plans>. Accessed: 15/06/2022.
2. MATHWORKS. *Pricing and Licensing*. 2022. Available also from: <https://es.mathworks.com/pricing-licensing.html?prodcode=ML&intendeduse=edu>. Accessed: 15/06/2022.
3. PAPERNEST. *Compañías de Luz, Precio kWh España*. 2022. Available also from: <https://www.companias-de-luz.com/precio-de-la-luz/kwh/espana/>. Accessed: 16/06/2022.
4. MOVISTAR. *Fibra Óptica 300Mb Simétrica*. 2022. Available also from: <https://www.movistar.es/particulares/internet/movistar-adsl/opciones-tarifas/ficha/movistar-fibra-optica-100-10mb-llamadas-simetr-cob>. Accessed: 16/06/2022.