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STUDY FOR THE NUMERICAL RESOLUTION OF CONSERVATION EQUATIONS OF MASS, MOMENTUM AND ENERGY TO BE APPLIED IN DIFFERENT ENGINEERING PROBLEMS (case 6)

STUDIES: Grau en Enginyeria en Tecnologies Aeroespacials

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TREBALL FINAL DE GRAU

BUDGET

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1. Budget

This document presents the estimated budget of the study, dividing the costs into direct costs and indirect costs.

1.1. Direct costs

These costs include all the related costs to the development of the project, such as investigation and study, code writing, memory writing, etc. The costs are computed using a reference price per hour for an engineer of 20 €/h. The following table shows the individual costs for each concept:

| Concept | Time (hours) | Price per hour (€/h) | Price (€) |
|---------------------------------------|--------------|----------------------|-------------|
| Investigation and theory study | 20 | 20 | 400 |
| Subtotal | 20 | | 400 |
| Code development and testing* | | | |
| 2D-Transient Conduction | 30 | 20 | 600 |
| Smith-Hutton | 20 | 20 | 400 |
| Driven Cavity | 60 | 20 | 1200 |
| Differentially Heated Cavity | 60 | 20 | 1200 |
| Flow around square cylinders | 100 | 20 | 2000 |
| Subtotal | 270 | | 5400 |
| Results post-processing | | | |
| Microsoft Excel usage | 20 | 20 | 400 |
| Matlab usage | 30 | 20 | 600 |
| Subtotal | 50 | | 1000 |
| Documents elaboration | | | |
| Report | 40 | 20 | 800 |
| Attachments | 5 | 20 | 100 |
| Subtotal | 45 | | 900 |
| TOTAL | 385 | | 7700 |

Table 1: Subdivision of the direct costs

* Simulation time is not included

1.2. Indirect costs

These costs come from the realization of the study but cannot be counted as direct costs, since they appear as secondary costs during the realization of the study. License costs or printing costs are included here. The following table shows the individual costs for each concept:

| Concept | Unities | Price per unity (€/u) | Price (€) |
|------------------------------|---------|-----------------------|------------|
| Matlab License | 1 | 105 | 105 |
| Microsoft Office License | 1 | 79 | 79 |
| Printing of documents | 1 | 50 | 50 |
| Bookbinding of the documents | 1 | 10 | 10 |
| TOTAL | | | 244 |

Table 2: Subdivision of the indirect costs

1.3. Total costs

Once the direct costs and the indirect costs have been explained, the total costs of the study are:

| | |
|-----------------------|---------------|
| Direct costs | 7700 € |
| Indirect costs | 244 € |
| TOTAL | 7944 € |