A company is producing three different types of glue A, B and C with different costs (euro per kg) as the table 1.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Workers salary | Electricity | Packaging |
| Glue A | 2 | 5 | 1 |
| Glue B | 5 | 2 | 3 |
| Glue C | 8 | 3 | 2 |

We are interested in finding the amount of glue A, B and C produced per day with specific requirements.

Assume that represent them respectively.

**Case 1**

The company wants to spend in one day of production exactly

|  |  |  |
| --- | --- | --- |
| Workers salary | Electricity | Packaging |
| 335 | 170 | 115 |

This problem can be formulated in a linear combination

that can be written also as a linear system

First, using augm matrix to check if the system is consistent or not:

[augm matrix]

Then reduce to echelon form:

[echelon form]

So the last column is not a pivot column so the system is consistent.

Therefore, the solution is =10, =15, =30

In conclusion, the amount of glue A, B and C produced per day are 10, 15, 30 kg respectively.

**Case 2**

The company wants to spend 620 euro per day, whatever the splitting into costs for workers salary, electricity, and packaging.

Assume that represent them.

Take Z as vector of solutions of the system: Z=

(augm matrix)

According to the first case, 20; then at least there is 1 solution.

The system has 4 equations and 6 unknowns then at least one of them is a free variable; this means that there are infinite solutions.

(reduced echelon form)