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Exercise 2.

1. Take for example 3 types of gravel and 2 different mines.

$n = 3$
$m = 2$

→ So $C: m \times m$
$c: n \times 1$
$C \cdot x - c: n \times 1$

→ Let's imagine I want 0'2 of gravel type 1, 0'4 of gravel type 2 and 0'4 of gravel type 3.

→ But, unfortunately, I got, for each type of gravel and mine:

Mine 1: 0'4 of type 1 gravel, 0'2 of type 2 and 0'3 of type 3.

Mine 2: 0'3 of type 1, 0'5 of type 2 and 0'2 of type 3

→ this can be written as:

$$C = \begin{pmatrix} 0'4 & 0'3 \\ 0'3 & 0'5 \\ 0'3 & 0'2 \end{pmatrix} \qquad c = \begin{pmatrix} 0'2 \\ 0'4 \\ 0'4 \end{pmatrix}$$

→ Continuation of Exercise 2

↳ this matrix multiplication means doing the following:

$$(0'4x + 0'3y - 0'2)^2 + (0'3x + 0'5y - 0'4)^2 + (0'3x + 0'2y - 0'4)^2$$

↳ I'm squaring because the absolute value function can't be derivated. (a.k.a. minimizing)

⇒ this kind of operations are known as sum of errors squared. If x and y are proportional, $y = 1 - x$. Then

$$0'06\,(x^2 - x + 1) = 0$$

$$x = 0'5 \Rightarrow y = 0'5$$

→ Let's compute the error, or least errors

$$0'35 - 0'2 = 0'15$$
$$0'4 - 0'4 = 0$$
$$0'23 - 0'4 = -0'15$$

$$\sum u_u^2 = \underline{0'045}$$

→ What if I take wrong values, e.g. $x = 0'4$ and $y = 0'6$:

$$\sum u_u^2 = 0'0196 + 0'004 + 0'0256 = \underline{0'0456}$$

bigger error.