Tarea final AC

Algoritmo de la división

Código

DIVISIÓN$(f_1, \ldots, f_2, f)$:

$q_1 := 0; \ldots; q_s := 0; r := 0 \; p := f$

while $p \neq 0$ **do**

  $i := 1$

  divisionoccurred=false

  while $i \leq s$ **and** divisionoccurred=false **do**

    if $\mathrm{lt}(f_i)$ divides $\mathrm{lt}(p)$ **then**

      $q_i := q_i + \mathrm{lt}(p) / \mathrm{lt}(f_i)$

      $p := p - (\mathrm{lt}(p) / \mathrm{op}(f_i)) f_i$

      divisionoccurred=true

    else

      $i := i + 1$

  if divisionoccurred = false **then**

    $r := r + \mathrm{lt}(p) \; p := p - \mathrm{lt}(p)$

return $q_1, \ldots, q_s, r$

Ejemplo del libro

Sean $f_1 = xy - 1$, $f_2 = y^2 - 1$, con órden lexicográfico. Si dividimos $f = xy^2 - x$ por $F = (f_1, f_2)$ obtenemos:

$$xy^2 - x = y(xy - 1) + 0(y^2 - 1) + (-x + y)$$

Si tomamos $F = (f_2, f_1)$, obtenemos:

$$xy^2 - x = x(y^2 - 1) + 0(xy - 1) + 0$$

En python:

```
R.<x,y> = PolynomialRing(RR, 2, "xy", order = "lex")
f = x*y^2-x; f1=x*y-1; f2=y^2-1

[q1,q2], r = div_poly([f1,f2],f)
print("Caso 1:")
show(html(f"${f} = {q1} ({f1}) + {q2} ({f2}) + ({r})$"))
print("Caso 2:")
f = x*y^2-x
f1=x*y-1
f2=y^2-1

[q2,q1], r = div_poly([f2,f1],f)
show(html(f"${f} = {q2} ({f2}) + {q1} ({f1}) + {r}$"))
```

Output

```
Caso 1:
```