Комп’ютерна алгебра

Лабораторна робот: базис Гребнера

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Варіант 2

Алгоритм Гребнера:

Input: A finite set *B* of polynomials

Output: A finite Gröbner basis *G* equivalent to *B*

1 *G*:=*B*

2 *C*:=*G*×*G*

3 while *C*≠∅ do

4 Choose a pair (*f*,*g*) from *C*

5 *C*:=*C*∖{(*f*,*g*)}

6 *h*:=RED(SPOL(*f*,*g*),*G*)

7 if *h*≠0 then

8 *C*:=*C*∪(*G*×{*h*})

9 *G*:=*G*∪{*h*}

10 return *G*

Результат:

Редукований:

i = x + y + (-1)\*z

j =x^2 + y^2 + z^2

S polynomial = x\*y + (-1)\*x\*z + (-1)\*y^2 + (-1)\*z^2,

S remainder = (-2)\*z^4 + (-2)\*z^3 + (-2)\*z^2

polynoms: [x^2 + y^2 + z^2, x + y + (-1)\*z, y + z^2]

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i = x + y + (-1)\*z

j =x^2 + y^2 + z^2

S polynomial = x\*y + (-1)\*x\*z + (-1)\*y^2 + (-1)\*z^2,

S remainder = 0

polynoms: [x^2 + y^2 + z^2, x + y -1z, y + z^2, (-2)\*z^4 + (-2)\*z^3 -2\*z^2]

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i = y + z^2

j =x^2 + y^2 + z^2

S polynomial = x^2\*z^2 + (-1)\*y^3 + (-1)\*y\*z^2,

S remainder = 0

polynoms: [x^2 + y^2 + z^2, x + y -1z, y + z^2, (-2)\*z^4 + (-2)\*z^3 -2\*z^2]

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i = y + z^2

j =x + y + (-1)\*z

S polynomial = x\*z^2 + (-1)\*y^2 + y\*z,

S remainder = 0

polynoms: [x^2 + y^2 + z^2, x + y -1z, y + z^2, (-2)\*z^4 + (-2)\*z^3 -2\*z^2]

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i = (-2)\*z^4 + (-2)\*z^3 + (-2)\*z^2

j =x^2 + y^2 + z^2

S polynomial = x^2\*z^3 + x^2\*z^2 + (-1)\*y^2\*z^4 + (-1)\*z^6,

S remainder = 0

polynoms: [x^2 + y^2 + z^2, x + y -1z, y + z^2, (-2)\*z^4 + (-2)\*z^3 -2\*z^2]

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i = (-2)\*z^4 + (-2)\*z^3 + (-2)\*z^2

j =x + y + (-1)\*z

S polynomial = x\*z^3 + x\*z^2 + (-1)\*y\*z^4 + z^5,

S remainder = 0

polynoms: [x^2 + y^2 + z^2, x + y -1z, y + z^2, (-2)\*z^4 + (-2)\*z^3 -2\*z^2]

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i = (-2)\*z^4 + (-2)\*z^3 + (-2)\*z^2

j =y + z^2

S polynomial = y\*z^3 + y\*z^2 + (-1)\*z^6,

S remainder = 0

polynoms: [x^2 + y^2 + z^2, x + y -1z, y + z^2, (-2)\*z^4 + (-2)\*z^3 -2\*z^2]

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[x^2 + y^2 + z^2, x + y + (-1)\*z, y + z^2, (-2)\*z^4 + (-2)\*z^3 + (-2)\*z^2]

Process finished with exit code 0