





**AIT** ALGORITHMIC  
INFORMATION  
THEORY  
VAASA FINLAND  
18th - 19th May 2005

AIT  
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# AIT

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# Welcome



abs/10/0404333 what is a law?



A man in a black shirt and glasses stands next to a whiteboard. He is pointing towards the whiteboard with his right hand. The whiteboard contains handwritten text and a diagram. The text includes 'abs/10/0404333' and 'what is a law?'. The diagram is a square with a wavy line inside, possibly representing a function or a set boundary.

$$\Omega = \sum_{p \text{ halts}} 2^{-|p|}$$

$0 < \Omega < 1$   
halting problem



$$\Omega = \sum_{p \text{ halts}} 2^{-|p|} \quad 0 < \Omega < 1$$

halting problem



Tymoczko New Directions in Philosophy of Math





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## Reduction to Groebner Bases Computation

In[72]:=

```
{time, GB} =
GroebnerBasis[{-i1 + x1^2 + x2^2, -i2 + x1^2 x2^2, -i3 + x1^3 x2 - x1 x2^3},
{x2, x1, i3, i2, i1}] // Timing
```

Out[72]=

```
{0. Second, {i1^2 i2 - 4 i2^2 - i3^2, -i2 + i1 x1^2 - x1^4, i1^2 i3 x1 - 2 i2 i3 x1 - i1 i3 x1^3 + i1^2 i2 x2 -
i1^2 x1 - 2 i2 x1 - i1 x1^3 + i3 x2, -i1 i3 + 2 i3 x1^2 - i1^2 x1 x2 + 4 i2 x1 x2,
-i3 x1 - 2 i2 x2 + i1 x1^2 x2, -i3 - i1 x1 x2 + 2 x1^3 x2, -i1 + x1^2 + x2^2}}
```

In[73]:=

```
PolynomialReduce[x1^7 x2 - x1 x2^7, GB, {x2, x1, i3, i2, i1},
MonomialOrder -> Lexicographic]
```

Out[73]=

```
{{{0, -i3 - 1/2 i1 x1 x2 - x1^3 x2, 0, 3/4 i1 x2 - 1/2 x1^2 x2 + x2^3/2, i1 - x1^2/2 + 3/4 x2^2,
3/4 i1 x1 - 1/2 x2^4, 1/2 i2 - 1/2 i3 - 1/2 i1 x1 x2 - 1/2 i2 x1^2 - 1/2 i3 x1^3 - 1/2 i1 x1^4 - 1/2 i2 x1^5 - 1/2 i3 x1^6 - 1/2 i1 x1^7}}
```

Next Slide

150% ◀ ◂









