Subject: Re: complex arithmetic
Posted by thompson on Wed, 06 Apr 1994 14:23:13 GMT
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stl@sma.ch (Stephen Strebel) writes:

> In article <1994Apr5.123735.8305@news.uit.no> royd@zapffe.mat-stat.uit.no (Roy Einar Dragseth) writes:
>> Why isn't this supported:
>> IDL> x = complex(0.,1.)
>> IDL> print, x^(1./3.)
>> % Operation illegal with complex type.
>> % Execution halted at $MAIN$ .
>>
>> We are running IDL. Version 3.5.1 (hp-ux hp_pa) on a HP9000/755.
>>
> Hi,

> neat little problem! I just tested this on my Sparc 10 running Solaris
> 4.1 with IDL version 3.5.1 and the problem seems even worse then you
> stated. The following works:
> IDL> x = complex(0.,1.)
> IDL> print,x^(3)
> ( -0.00000, -1.00000

> but, as soon as you change the print to include a float things blow up:
> IDL> print,x^(3.)
> % Operation illegal with complex type.
> % Execution halted at $MAIN$ .

> does anyone understand this? SHould such an operation even be allowed?

I think the problem is that such problems are degenerate--there is more than one correct answer. For example, if we define A and B to be

```
 IDL> A = COMPLEX(1,1)
 IDL> B = COMPLEX(-1,-1)
```

and C to be

and B to be

```
 IDL> C = A^2
 IDL> PRINT, C
 (      0.00000,      2.00000)
```

then A can be thought of as the square root of C. However, so can B, because A^2 and B^2 resolve to the same value. Thus, which is the correct answer for

C^(0.5)?

Evidently, IDL gets around this ambiguity by not allowing one to calculate a complex number to a non-integer power, even if the floating point number could be simplified to an integer such as in your example above.

Bill Thompson

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