
Subject: Complex exponentiation problem
Posted by [brian.jackel](#) on Fri, 17 May 1996 07:00:00 GMT
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There appears to be something wrong when using the "^" operator on complex numbers under certain conditions. If anyone could shed some light on this it would be greatly appreciated. I can avoid the problem for now by using only integer exponents, but it would be nice if I could get the general case to work as expected.

Here's a code fragment which shows the problem:

```
;-----  
;create a complex number, print it ou  
IDL> w= EXP( -COMPLEX(0.0,1.0)*(2.0*pi)/n)  
IDL> print,w  
( 0.923880, -0.382683)  
  
;raise it to a variety of integer powers, everything okay  
IDL> print,w^[1,2,3]  
( 0.923880, -0.382683)( 0.707107, -0.707107)( 0.382683, -0.923880)  
  
;raise it to the same powers, but floating point. Not okay  
IDL> print,w^[1.0,2.0,3.0]  
( 0.857090, 0.000000)( 0.857090, 0.000000)( 0.857090, 0.000000)  
  
;Done individually, everything works  
IDL> print,w^1.0  
( 0.923880, -0.382683)  
IDL> print,w^2.0  
( 0.707107, -0.707107)  
IDL> print,w^3.0  
( 0.382683, -0.923880)  
;-----
```

This happens for { alpha vms vms 4.0.1} and { x86 Win32 Windows 4.0.1}.
Why?

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Subject: Re: Complex exponentiation problem
Posted by [asb](#) on Tue, 28 May 1996 07:00:00 GMT
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It also works correctly if the exponent is a complex array:

```
IDL> w= EXP( -COMPLEX(0.0,1.0)*(2.0*pi)/16)
IDL> print,w
(  0.923880,  -0.382683)
IDL> p=[1,2,3]
IDL> print,w^p
(  0.923880,  -0.382683)(  0.707107,  -0.707107)
(  0.382683,  -0.923880)
IDL> p=1.0*p
IDL> print,w^p
(  0.857090,  -0.000000)(  0.857090,  -0.000000)
(  0.857090,  -0.000000)IDL> w= EXP( -COMPLEX(0.0,1.0)*(2.0*pi)/16)
IDL> print,w
(  0.923880,  -0.382683)
IDL> p=[1,2,3]
IDL> print,w^p
(  0.923880,  -0.382683)(  0.707107,  -0.707107)
(  0.382683,  -0.923880)
IDL> p=1.0*p
IDL> print,w^p
(  0.857090,  -0.000000)(  0.857090,  -0.000000)
(  0.857090,  -0.000000)
IDL> p=complex(1.,0.)*p
IDL> print,w^p
(  0.923880,  -0.382683)(  0.707107,  -0.707107)
(  0.382683,  -0.923880)

IDL> p=complex(1.,0.)*p
IDL> print,w^p
(  0.923880,  -0.382683)(  0.707107,  -0.707107)
(  0.382683,  -0.923880)
```

Truly bizarre.

Alan
