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,     -0.00000)(     0.857090,     -0.00000)
(     0.857090,     -0.00000)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,     -0.00000)(     0.857090,     -0.00000)
(     0.857090,     -0.00000)
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
