
Subject: Arithmetic error from NR_MACHAR()

Posted by on Mon, 29 Jun 1998 07:00:00 GMT

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Hi all,

I tried to find out the machine precision on my LINUX PC with IDL 5.0.

The result is the following:

```
IDL> help, /struc, NR_MACHAR(/DOUBLE)
```

```
** Structure DMACHAR, 13 tags, length=68:
```

IBETA	LONG	2
IT	LONG	64
IRND	LONG	2
NGRD	LONG	0
MACHEP	LONG	-63
NEGEP	LONG	-64
IEXP	LONG	2
MINEXP	LONG	-1075
MAXEXP	LONG	-1073
EPS	DOUBLE	1.0842022e-19
EPSNEG	DOUBLE	5.4210109e-20
XMIN	DOUBLE	0.0000000
XMAX	DOUBLE	Inf

```
% Program caused arithmetic error: Floating divide by 0
```

It seems, that MAXEXP has got the wrong value.

Also XMAX, which is according to the manual calculated as

$(1 - \text{EPSNEG}) * \text{IBETA}^{\text{MAXEXP}}$, is Infinity, what may be the origin of the error message.

But then I tried this:

```
IDL> prec = NR_MACHAR(/DOUBLE)
```

```
% Program caused arithmetic error: Floating divide by 0
```

```
IDL> print, (1-prec.EPSNEG)*prec.IBETA^prec.MAXEXP  
0.0000000
```

There I dont get 'Infinity' as result, but '0.0'.

If, however, I try the same on a UNIX-system, first everything seems ok.

```
IDL> help, /struc, NR_MACHAR(/DOUBLE)
```

```
** Structure DMACHAR, 13 tags, length=72:
```

IBETA	LONG	2
IT	LONG	53
IRND	LONG	2
NGRD	LONG	0

MACHEP	LONG	-52
NEGEP	LONG	-53
IEXP	LONG	11
MINEXP	LONG	-1022
MAXEXP	LONG	1024
EPS	DOUBLE	2.2204460e-16
EPSNEG	DOUBLE	1.1102230e-16
XMIN	DOUBLE	2.2250739e-308
XMAX	DOUBLE	1.7976931e+308

But - if I calculate XMAX myself again - the result is 0.0:
 IDL> prec = NR_MACHAR(/DOUBLE)
 IDL> print, (1-prec.EPSNEG)*prec.IBETA^prec.MAXEXP
 0.0000000

If I use MACHAR() instead of NR_MACHAR(), exactly the same happens.
 The keyword DOUBLE also is not the origin of the problem.

Maybe anybody else understands, what happens?

Thanks,
 Heiko
 --

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