

Could someone please explain this:

```
WAVE> junk = check_math(1,0)
WAVE> print, junk
      0
WAVE> y = exp(-9.2^2)
WAVE> print, y, check_math(1,0)
1.74307e-37      0
WAVE> y = exp(-9.3^2)
WAVE> print, y, check_math(1,0)
2.74074e-38      0
WAVE> y = exp(-9.4^2)
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
WAVE> print, y, check_math(1,0)
4.22418e-39      0
```

I first ran into the problem in a set of loops, and narrowed down the

```
% Program caused arithmetic error: Floating illegal operand
```

error to a call to the exp() function. A little fooling around resulted in getting to the above. It appears that when the argument reaches -9.4^2 , the underflow occurs, but I cannot understand the "illegal operand". Also, why does CHECK_MATH() not catch the underflow.

And, now for more:

```
WAVE> .run
- for i=90,100 do begin
-   x = i/10.0
-   y = exp(-x^2)
-   print, x, y, check_math(1,0)
- endfor
- end
% Compiled module: $MAIN$.
      9.00000 6.63968e-36      128
      9.10000 1.08661e-36      128
      9.20000 1.74307e-37      128
      9.30000 2.74074e-38      128
% Program caused arithmetic error: Floating underflow
```

```
% Program caused arithmetic error: Floating illegal operand
  9.40000 4.22418e-39    160
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
  9.50000 6.38150e-40    160
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
  9.60000 9.44966e-41    160
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
  9.70000 1.37159e-41    160
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
  9.80000 1.95201e-42    160
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
  9.90000 2.71852e-43    160
% Program caused arithmetic error: Floating underflow
% Program caused arithmetic error: Floating illegal operand
 10.0000 3.78351e-44    160
```

Again, I can see the problem for $x > 9.3$. But, what is the CHECK_MATH() doing? First, it seems to say that there is an "floating point operand error", and then it is that *plus* and underflow. What is the "floating point operand error" that the code 128 is indicating?

I am running PV-WAVE CL Version 6.01 (sun4 solaris sparc)
on a Sun Ultra 10 under Solaris 8.

thanks

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