

[6.58] Extract floating-point mantissa and exponent

In some applications it is useful to obtain the mantissa and exponent of floating point numbers. In scientific notation, any floating-point number can be expressed as $a.bEc$, where $a.b$ is the mantissa, c is the exponent, and a is not equal to zero. While the exponent and mantissa can be obtained starting out with the `log()` function, some book keeping is required to account for negative arguments. The function shown below returns the exponent and mantissa, and retains the full mantissa precision.

```
mantexp(n)
Func
@(n) return {mantissa,exponent}
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local s,e

format(n,"s")->s
expr(right(s,dim(s)-instr(s,"E")))->e
return {n*(10^-e),e}

EndFunc
```

If the list returned by `mantexp()` is stored to `foo`, then use `foo[1]` to get the mantissa, and `foo[2]` to get the exponent.

Some examples:

<code>mantexp(0)</code>	returns	<code>{0,0}</code>
<code>mantexp(1)</code>	returns	<code>{1,0}</code>
<code>mantexp(100)</code>	returns	<code>{1,2}</code>
<code>mantexp(1.23E17)</code>	returns	<code>{1.23,17}</code>
<code>mantexp(-456E-100)</code>	returns	<code>{-4.56,102}</code>

`mantexp()` works by converting the input argument to a string in scientific notation, then the exponent is extracted based on the location of the 'E' character in the string. The mantissa is found by dividing the original argument by $10^{(\text{exponent})}$. While the mantissa could also be found from the string in scientific notation, two least-significant digits would be lost, since the `format()` function only returns, at most, 12 significant digits.