

## Re: $\exp(x) + kx = 0$ ; analytic solution

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Per Abrahamsen wrote:

I can easily convince myself that there is exactly one solution when  $k > 0$ , but does it have a nice analytical solution, or do I have to use numeric methods?

I apologize if this is the wrong place to ask.

The analytic solution returned by Mathematica 6.0.1 for  $k$  positive and  $x$  real is in terms of *\*ProductLog\** (principal value of the Lambert  $W$ -function in Mathematica. See <http://mathworld.wolfram.com/LambertW-Function.html>)

```
In[1]:= Reduce[{Exp[x] + k x == 0, k > 0}, x, Reals]
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Out[1]= k > 0 && x == -ProductLog[1/k]
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Regards,

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Jean-Marc

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