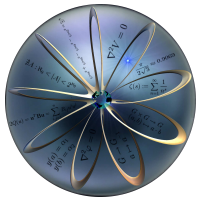

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Lambert W function

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Synonym	product log

Lambert's W function is the inverse of the function $f : \mathbb{C} \to \mathbb{C}$ given by $f(x) := xe^x$. That is, $W(x)$ is the complex valued function that satisfies

$$W(x)e^{W(x)} = x,$$

for all $x \in \mathbb{C}$. In practice the definition of $W(x)$ requires a branch cut, which is usually taken along the negative real axis. Lambert's W function is sometimes also called product log function.

This function allow us to solve the functional equation

$$g(x)^{g(x)} = x$$

since

$$g(x) = e^{W(\ln(x))}.$$

1 References

A site with good information on Lambert's W function is Corless' page `http://kong.apmaths.uwo.ca/ rcorless/frames/PAPERS/LambertW/`"On the Lambert W Function"