Liouville's Theorem (Differential algebra)

Vanya Vorobiov

Sber

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Basic definitions

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Let F be the differential field. Then

- b is called the logarithm of a if $b' = \frac{a'}{a}$
- b is called the exponent of a if $a' = \frac{b'}{b}$

What is integrability in elementary functions

Definition

The extension E is called elementary if it can be presented as $E = F(t_1, \ldots, t_n)$ and for all i t_i is logarithm or exponent or algebraic over $F(t_1, \ldots, t_{i-1})$.