Exact Solutions > Functional Equations > Linear Functional Equations with Several Independent Variables

3. Linear Functional Equations with Several Independent Variables

- 1. f(x+y) = f(x) + f(y). Cauchy equation.
- 2. f(xy) = f(x) + f(y). Logarithmic Cauchy equation.
- 3. 2f(x+y) = f(2x) + f(2y). Jensen equation.
- 4. $f(x+y) + f(x-y) = 2f(x) \cosh y$.
- 5. $f(x+y) + f(x-y) = 2f(x)\cos y$.
- **6.** $f(\sqrt{x^2+y^2}) = f(x)f(y)$. Gauss equation.
- 7. $f((x^n + y^n)^{1/n}) = f(x) + f(y)$.
- **8.** f(x) + g(y) = h(x + y). Pexider's equation.
- 9. $f(x) + (1-x)f\left(\frac{y}{1-x}\right) = f(y) + (1-y)f\left(\frac{x}{1-y}\right)$.

Basic equation of information theory.

10.
$$f(1-x) + (1-x)^{\alpha} f\left(\frac{y}{1-x}\right) = f(y) + (1-y)^{\alpha} f\left(\frac{x}{1-y}\right)$$
.

- 11. f(ax, ay) = f(x, y).
- 12. $f(ax, ay) = a^{\beta} f(x, y)$. Homogeneity equation.
- 13. $f(ax, a^{\beta}y) = f(x, y)$.
- 14. $f(ax, a^{\beta}y) = a^{\gamma}f(x, y)$.
- 15. f(x,y) + f(y,z) = f(x,z).

The EqWorld website presents extensive information on solutions to various classes of ordinary differential equations, partial differential equations, integral equations, functional equations, and other mathematical equations.

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