



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. $f(x, y) + f(y, z) = f(x, z)$.