



4. Nonlinear Functional Equations with Several Independent Variables

1. $f(x + y) = f(x)f(y)$. *Exponential Cauchy equation.*
2. $f(xy) = f(x)f(y)$. *Power-law Cauchy equation.*
3. $f(y + x) + f(y - x) = 2f(x)f(y)$. *D'Alembert equation.*
4. $f(x + y) = a^{xy}f(x)f(y)$.
5. $f(x + y) = f(x) + f(y) - af(x)f(y)$. *Equation of the theory probability.*
6. $f(x)g(y) = h(x + y)$.
7. $f(x)g(y) + h(y) = f(x + y)$.
8. $f(x + y)f(x - y) = f^2(x)$. *Lobachevsky equation.*
9. $\left(\frac{f^2(x) + f^2(y)}{2}\right)^{1/2} = f\left(\left(\frac{x^2 + y^2}{2}\right)^{1/2}\right)$.
10. $f(x, y)f(y, z) = f(x, z)$.
11. $M(f(x), f(y)) = f(M(x, y))$.
12. $f_1(x)g_1(y) + f_2(x)g_2(y) + f_3(x)g_3(y) = 0$. *Bilinear functional equation.*
13. $f_1(x)g_1(y) + f_2(x)g_2(y) + f_3(x)g_3(y) + f_4(x)g_4(y) = 0$. *Bilinear functional equation.*
14. $f(x) + g(y) = Q(z)$, **where** $z = \varphi(x) + \psi(y)$.
15. $f(t) + g(x) + h(x)Q(z) + R(z) = 0$, **where** $z = \varphi(x) + \psi(t)$.
16. $f(t) + g(x)Q(z) + h(x)R(z) = 0$, **where** $z = \varphi(x) + \psi(t)$.