



2. Volterra Integral Equations of the Second Kind

2-1. Integral equations whose kernels contain power-law functions

1. $y(x) - \lambda \int_a^x y(t) dt = f(x).$
2. $y(x) + \lambda \int_a^x (x-t)y(t) dt = f(x).$
3. $y(x) + \lambda \int_a^x (x-t)^2 y(t) dt = f(x).$
4. $y(x) + \lambda \int_a^x (x-t)^3 y(t) dt = f(x).$
5. $y(x) + A \int_a^x (x-t)^n y(t) dt = f(x).$
6. $y(x) + \lambda \int_a^x \frac{y(t) dt}{\sqrt{x-t}} = f(x).$ *Abel equation of the second kind.*
7. $y(x) - \lambda \int_0^x \frac{y(t) dt}{(x-t)^\alpha} = f(x).$ *Generalized Abel equation of the second kind.*

2-2. Integral equations whose kernels contain exponential functions

8. $y(x) + A \int_a^x e^{\lambda(x-t)} y(t) dt = f(x).$
9. $y(x) + A \int_a^x [e^{\lambda(x-t)} - 1] y(t) dt = f(x).$
10. $y(x) + A \int_a^x (x-t)e^{\lambda(x-t)} y(t) dt = f(x).$

2-3. Integral equations whose kernels contain hyperbolic or special functions

11. $y(x) + A \int_a^x \cosh[\lambda(x-t)] y(t) dt = f(x).$
12. $y(x) + A \int_a^x \sinh[\lambda(x-t)] y(t) dt = f(x).$
13. $y(x) - \lambda \int_0^x J_0(x-t) y(t) dt = f(x).$

2-4. Integral equations whose kernels contain arbitrary functions

$$14. \quad y(x) - \int_a^x g(x)h(t)y(t) dt = f(x).$$

$$15. \quad y(x) + \int_a^x (x-t)g(x)y(t) dt = f(x).$$

$$16. \quad y(x) + \int_a^x (x-t)g(t)y(t) dt = f(x).$$

$$17. \quad y(x) + \int_a^x K(x-t)y(t) dt = f(x). \quad \textit{Renewal equation.}$$

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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<http://eqworld.ipmnet.ru/en/solutions/ie/ie-toc2.pdf>