

5.
$$y(x) + \int_a^b g(x)y(x)y(t) dt = f(x)$$
.

A solution:

$$y(x) = \frac{f(x)}{1 + \lambda g(x)},$$

where λ is a root of the algebraic (or transcendental) equation

$$\lambda - \int_{a}^{b} \frac{f(t) dt}{1 + \lambda g(t)} = 0.$$

Different roots generate different solutions of the integral equation.

Reference

Polyanin, A. D. and Manzhirov, A. V., Handbook of Integral Equations, CRC Press, Boca Raton, 1998.

Copyright © 2004 Andrei D. Polyanin

http://eqworld.ipmnet.ru/en/solutions/ie/ie0605.pdf