

4.
$$y(x) + \int_a^b g(t)y(x)y(t) dt = f(x)$$
.

Solutions:

$$y_1(x) = \lambda_1 f(x), \qquad y_2(x) = \lambda_2 f(x),$$

where λ_1 and λ_2 are the roots of the quadratic equation

$$I\lambda^2 + \lambda - 1 = 0,$$
 $I = \int_a^b f(t)g(t) dt.$

Reference

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

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http://eqworld.ipmnet.ru/en/solutions/ie/ie0604.pdf