12. $y(x) + \int_a^x \sin[\lambda(x-t)] f\big(t, y(t)\big)\, dt = g(x).$

The solution of this integral equation is determined by the solution of the second-order ordinary differential equation

$$y''_{xx} + \lambda f(x, y) + \lambda^2 y - \lambda^2 g(x) - g''_{xx}(x) = 0$$

under the initial conditions

$$y(a) = g(a), \qquad y'_x(a) = g'_x(a).$$

Reference

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

