



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

1°. Solution for $\lambda(A - \lambda) > 0$:

$$y(x) = f(x) - \frac{A\lambda}{k} \int_a^x \sin[k(x-t)]f(t) dt, \quad \text{where } k = \sqrt{\lambda(A - \lambda)}.$$

2°. Solution for $\lambda(A - \lambda) < 0$:

$$y(x) = f(x) - \frac{A\lambda}{k} \int_a^x \sinh[k(x-t)]f(t) dt, \quad \text{where } k = \sqrt{\lambda(\lambda - A)}.$$

3°. Solution for $A = \lambda$:

$$y(x) = f(x) - \lambda^2 \int_a^x (x-t)f(t) dt.$$

Reference

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