16. $\displaystyle\int_a^x \{\cosh[\lambda(x-t)]+b\}y(t)\,dt = f(x), \qquad f(a)=0.$

For $b = 0$, see equation 1.14. For $b = -1$, see equation 1.15.

1°. Solution for $b(b+1) < 0$:

$$y(x) = \frac{f'_x(x)}{b+1} - \frac{\lambda^2}{k(b+1)^2}\int_a^x \sin[k(x-t)]f'_t(t)\,dt, \qquad \text{where} \quad k = \lambda\sqrt{\frac{-b}{b+1}}.$$

2°. Solution for $b(b+1) > 0$:

$$y(x) = \frac{f'_x(x)}{b+1} - \frac{\lambda^2}{k(b+1)^2}\int_a^x \sinh[k(x-t)]f'_t(t)\,dt, \qquad \text{where} \quad k = \lambda\sqrt{\frac{b}{b+1}}.$$

Reference

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

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