



4.  $\int_0^b \frac{y(t)}{|x^\lambda - t^\lambda|^k} dt = f(x), \quad 0 < k < 1, \quad \lambda > 0.$

Solution:

$$y(x) = -Ax^{\frac{\lambda(k-1)}{2}} \frac{d}{dx} \left[ \int_x^b \frac{t^{\frac{\lambda(3-2k)-2}{2}} dt}{(t^\lambda - x^\lambda)^{\frac{1-k}{2}}} \int_0^t \frac{s^{\frac{\lambda(k+1)-2}{2}} f(s) ds}{(t^\lambda - s^\lambda)^{\frac{1-k}{2}}} \right],$$
$$A = \frac{\lambda^2}{2\pi} \cos\left(\frac{\pi k}{2}\right) \Gamma(k) \left[ \Gamma\left(\frac{1+k}{2}\right) \right]^{-2},$$

where  $\Gamma(k)$  is the gamma function.

### Reference

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