18. $\displaystyle\int_0^{\pi/2} y(\xi)\,dt = f(x), \qquad \xi = x\sin t.$

Schlomilch (Schlömilch) equation.

Solution:

$$y(x) = \frac{2}{\pi}\left[f(0) + x\int_0^{\pi/2} f'_\xi(\xi)\,dt\right], \qquad \xi = x\sin t.$$

References

Whittaker, E. T. and Watson, G. N., *A Course of Modern Analysis*, Cambridge Univ. Press, Cambridge, 1958.

Gakhov, F. D., *Boundary Value Problems* [in Russian], Nauka, Moscow, 1977.

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

