16. $y(x) - \displaystyle\int_{-\infty}^{\infty} K(x-t)y(t)\,dt = f(x).$

The Fourier transform is used to solve this equation.

Solution:

$$y(x) = f(x) + \int_{-\infty}^{\infty} R(x-t)f(t)\,dt,$$

where

$$R(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} \widetilde{R}(u)e^{iux}\,du, \quad \widetilde{R}(u) = \frac{\widetilde{K}(u)}{1 - \sqrt{2\pi}\,\widetilde{K}(u)}, \quad \widetilde{K}(u) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} K(x)e^{-iux}\,dx.$$

References

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