5. $\displaystyle\int_{-\infty}^{\infty} \frac{y(t)}{|x-t|^{1-\lambda}}\,dt = f(x), \qquad 0 < \lambda < 1.$

Solution:

$$y(x) = \frac{\lambda}{2\pi}\tan\Big(\frac{\pi\lambda}{2}\Big)\int_{-\infty}^{\infty}\frac{f(x)-f(t)}{|x-t|^{1+\lambda}}\,dt.$$

It assumed that the condition $\displaystyle\int_{-\infty}^{\infty}|f(x)|^p dx < \infty$ is satisfied for some p, $1 < p < 1/\lambda$.

References

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