



4. $y(x+1) - a(x-b)(x-c)y(x) = 0.$

Solution:

$$y(x) = \Theta(x)a^x\Gamma(x-b)\Gamma(x-c),$$

where $\Gamma(x)$ is the gamma function, $\Theta(x) = \Theta(x+1)$ is an arbitrary periodic function with unit period.

References

Miroyubov, A. A., and Soldatov, M. A., *Linear Homogeneous Difference Equations* [in Russian], Nauka, Moscow, 1981 (page 52).

Polyanin, A. D. and Manzhirov, A. V., *Handbook of Integral Equations: Exact Solutions (Supplement. Some Functional Equations)* [in Russian], Faktorial, Moscow, 1998.