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APPROXIMATING RESOLVENTS FOR VOLTERRA INTEGRAL EQUATIONS

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Abstract. The vector-valued integral equation $x(t) = a(t) - \int_0^t C(t,s)x(s)ds$ has the variation of parameters solution $x(t) = a(t) - \int_0^t R(t,s)a(s)ds$, where $R(t,s)$ is the resolvent corresponding to the kernel $C(t,s)$. We obtain insight into the behavior of R using the first-order approximant $R_1(t,s) = C(t,s) - \int_s^t C(t,u)C(u,s)du$, illustrating this approach with several examples.

Keywords. Integral Equations, Resolvents, Bivariate Convolution, Successive Substitution, Singular Kernels

AMS (MOS) subject classification: 45D05.

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