1113-45-150 **Leigh C. Becker*** (lbecker@cbu.edu), Department of Mathematics, 650 E. Parkway S., Memphis, TN 38104. *Solutions of Complementary Resolvent and Fractional Differential Equations.*

This is a study of the solutions of both the scalar resolvent equation

$$R(t) = \lambda t^{q-1} - \lambda \int_0^t (t-s)^{q-1} R(s)\, ds, \qquad (\mathrm{R}_\lambda)$$

where $\lambda > 0$ and $q \in (0,1)$, and of the initial value problem

$$D^q x(t) = -\lambda \Gamma(q) x(t), \quad \lim_{t \to 0^+} t^{1-q} x(t) = \lambda, \qquad (\mathrm{F}_\lambda)$$

where the fractional differential equation is of Riemann-Liouville type. First, *a priori* bounds on potential solutions of (R_λ) are established. Then, for given $\lambda > 0$ and $q \in (0,1)$, it is proved with Banach's contraction mapping principle that a unique continuous solution of (R_λ) exists on a short interval. Using the *a priori* bounds, Schaefer's fixed point theorem, and a "uniqueness of continuation" result, it is shown that this solution—the *resolvent*—exists and is unique on the entire interval $(0, \infty)$. Important properties of the resolvent are also obtained. It is also shown that the resolvent is also the unique continuous solution of (F_λ). Finally, a closed-form formula for the resolvent expressed in terms of the two-parameter Mittag-Leffler function is derived. (Received August 18, 2015)