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**Pavel B Dubovski\***, pdubovsk@stevens.edu, and **Jeffrey Slepoi**. *Generalized Fractional Bessel Equation*.

We construct the existence theory for generalized fractional Bessel differential equations and find the solutions in form of fractional and logarithmic fractional power series. We figure out the cases when the series solution is unique, non-unique, or does not exist. The uniqueness theorem in space  $C^p$  is proved for the corresponding initial value problem. The generalized fractional Bessel equation

$$\sum_{i=1}^m d_i x^{\alpha_i} D^{\alpha_i} u(x) + (x^\beta - \nu^2)u(x) = 0, \alpha_i > 0, \beta > 0,$$

includes fractional and classical Bessel equations as particular cases. The theory is constructed for the positive coefficients  $d_i$  and has a threshold admissible value for  $\nu^2$ . It is supported by several numerical examples and counterexamples that justify the necessity of the imposed conditions. (Received January 19, 2021)