1165-34-312 **Pavel Dubovski** (pdubovsk@stevens.edu), NJ , and **Jeffrey A Slepoi*** (jslepoi@stevens.edu), 1121 Sylvan Ln, Mountainside, NJ 07092. *Elimination of singularity by substitution in Caputo fractional derivative. Solving Fractional Differential Equations by substitution.*

Solving differential equations with fractional derivatives (FrDEs) require elimination of singularity which is inherent in the definition of fractional derivatives. The method of integration by parts to eliminate this singularity is well known. It allows to solve some FrDEs but increases the degree of the equation and often is not stable. We suggest another approach: elimination of singularity by substitution. It keeps the degree of the equation, presents an opportunity to define Caputo fractional derivative using the form similar to the Grünwald-Letnikov definition. We present a sufficient condition for a well-conditioned problem that gets generated in numerical representation of the linear FrDE represented through Finite Differences Methods (FDM) when the substitution method is applied to the fractional derivatives. We demonstrate how some FrDEs can be solved using this method with full confidence that the solution is accurate with at least second order of approximation. (Received January 20, 2021)