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Zachary Denton* (zdenton@ncat.edu). *Monotone Method for Multi-Order N-Systems of Riemann-Liouville Fractional Differential Equations*. Preliminary report.

We develop the monotone method for nonlinear multi-order N-systems of Riemann-Liouville fractional differential equations. That is, a hybrid system of nonlinear equations of orders $q_1, q_2, q_3, \dots, q_N$ and where $0 < q_i < 1$. In the development of this method we recall any needed existence results along with any necessary changes; including results from needed linear theory. Further we prove a comparison result paramount for the discussion of fractional multi-order inequalities that utilizes lower and upper solutions of the system. The monotone method is then developed via the construction of sequences of linear systems based on the upper and lower solutions, and are used to approximate the solution of the original nonlinear multi-order system. (Received September 12, 2014)