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**Scott C. Gensler\*** ([scott.gensler@huskers.unl.edu](mailto:scott.gensler@huskers.unl.edu)). *The General Operator  $\nabla^\gamma$  and Using It to Extend Results Involving  $\nabla_a^\gamma$  and  $\nabla_{a*}^\gamma$* . Preliminary report.

In this talk we define and explore, for any real number  $\gamma$ , a general fractional operator  $\nabla^\gamma$ . This is a generalization of the familiar, iterated difference operator  $\nabla^N$ . Indeed, when  $\gamma$  is a natural number, the two coincide. These general fractional operators have very nice properties. For example, they commute with each other, compose nicely, and are invertible. While in most cases the general operator,  $\nabla^\nu$ , differs slightly from the Riemann-Liouville operator,  $\nabla_a^\nu$ , and the Caputo operator,  $\nabla_{a*}^\nu$ , it is closely related to both and interacts nicely with them. As such, one of the things it can be used for is to simplify and extend many of the prior results involving the  $\nabla_a^\nu$  and  $\nabla_{a*}^\nu$  operators. (Received September 20, 2017)