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Mark Burgin*, Dept. of Mathematics, University of California, Los Angeles, Los Angeles, CA 90095. *From Classical Analysis to Neoclassical Analysis: Extending the Scope of Analysis*. Preliminary report.

Calculus introduced by Newton and Leibnitz and developed by many generations has proved very useful in physics, engineering, economics, etc. However, the development of science and technology explicated limitations of the classical calculus. Calculus and analysis as its rigorous extension are based on infinite processes (limits, continuity, differentiation, and integration) and assume infinite precision of objects and operations. At the same time, computation is limited to a finite number of symbols and achieves full exactness in a very limited number of cases. Another cause of imprecision is measurement, which always gives approximate results. Thus, constructions and methods of the classical analysis are only approximations to reality. To eliminate this deficiency, the classical analysis has been extended to neoclassical analysis in the works of Burgin, Kalina, Klee, Phu, Sostak, Yandl and others. The aim was to extend the powerful technique of the classical calculus to a much broader scope and to make this technique more relevant to the situation in physics and computation. In addition, neoclassical analysis extends and even completes many basic results without increasing complexity of proofs. This makes feasible to teach analysis in the form of neoclassical analysis. (Received August 14, 2007)