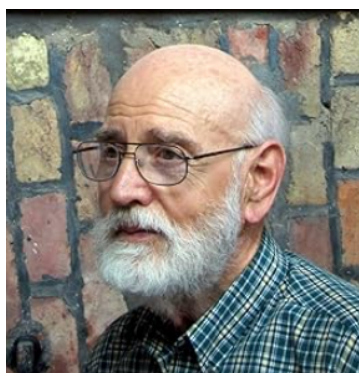




Obituary to Professor T. A. Burton (1935 – 2025)



Professor Theodore A. Burton, aged 89, passed away on Sunday, January 5, 2025, in Port Angeles, Washington. T. A. Burton (hereafter T. A.) was born on September 7, 1935, on a farm in Kansas, the fifth child in his family. It was the time of the Great Depression in the United States, and when the Dust Bowl was wreaking havoc across the Midwestern United States. At the age of five, T. A. with his family moved to Idaho, then to California, and finally to the Cascade Mountains of Washington State. Here he completed elementary and high school, and on the day he graduated from high school, he was drafted into the Army for two years. As a result of his military service, he became eligible for the Veteran's Higher Education Program. In 1959, he graduated from Washington State College with a Bachelor of Science degree, cum laude. His academic success earned him a full scholarship for three years to pursue a Ph.D. in mathematics.

His mathematical work began in 1959 under the supervision of Professor Donald W. Bushaw. Professor Bushaw was a student of Solomon Lefschetz, and inherited his interest in the theory of ordinary differential equations. He assigned T. A. to study the problem of global stability of a nonlinear oscillator.

After receiving his Ph.D. in 1964, T. A. joined the faculty of the University of Alberta in Edmonton, Canada. In 1966, he accepted a position at Southern Illinois University (SIU) in Carbondale, Illinois, where he remained on the faculty for the remainder of his academic career.

As part of the research for his Ph.D. thesis, T. A. obtained a fundamental result in the theory of nonlinear oscillations. Namely, he established the boundary at which the behavior of solutions of a nonlinear system coincides with the behavior of solutions of a linear system with constant parameters.

In the study of uniform asymptotic stability, T. A. obtained fundamental results for functional differential and integral equations. In this case, Lyapunov stability theory

was extended to integral equations with singular kernels and, in particular, to fractional differential equations.

Fixed point theory was significantly developed in the works of T. A. in connection with the study of the stability of integro-differential equations and the theory of periodic solutions of Volterra integro-differential equations with infinite delay.

Dr. T. A. Burton has published more than 215 scientific papers in mathematical journals devoted to research in the theory of ordinary, integral, functional and fractional differential equations. He is also the author of 6 monographs and editor of 2 books on mathematical biology. According to Google Scholar, his works have been cited more than 9000 times by other leading authors and researchers.

T. A. Burton always considered his greatest achievement in the academic field to be the guidance and advice he gave to his 13 graduate students.

Over the years, T. A. was interested in a variety of research problems, and Lyapunov stability theory permeated all of them in one way or another. Some of his early study was on boundedness and stability of second order nonlinear equations. This included his work with the late Carl Townsend (also a student of Bushaw at Washington State as well as a colleague of T. A. at SIU) on the Liénard equation. Other results on the oscillation of nonlinear equations included collaboration with Ronald Grimmer and other faculty members at SIU. T. A. loved mathematics and passed that love on to his students. His influence on them was immense; he was their mentor, their friend, and their colleague all at once.

A detailed analysis of the main results of Professor T. A. Burton is presented in the article PERSONAGE IN SCIENCE Professor Theodore A. Burton by J. H. Dshalalow (USA) and A. A. Martynyuk (Ukraine), *Nonlinear Dynamics and Systems Theory*, 12 (4) (2012) 325–332.

Many of T. A.'s most significant results are published in the monographs:

- Burton, T. A. *Volterra Integral and Differential Equations*. Academic Press, Orlando, 1983.
- Burton, T. A. *Stability and Periodic Solutions of Ordinary and Functional Differential Equations*. Academic Press, Orlando, 1985; reprinted by Dover, Mineola, New York, 2005.
- Burton, T. A. *Burton, Volterra Integral and Differential Equations, Second Edition*. Elsevier, Amsterdam, 2005.
- Burton, T. A. *Stability by Fixed Point Theory for Functional Differential Equations*. Dover, Mineola, New York, 2006.
- Burton, T. A. *Liapunov Functionals for Integral Equations*, 2008.
- Burton, T. A. *Burton, Liapunov Theory for Integral Equations with Singular Kernels and Fractional Differential Equations*, 2012, Amazon.co.uk, 379 pages.

In the memory of all who worked and communicated with him, Professor T.A. Burton will remain the best teacher, a true friend and a charming person.

*John Graef (USA), A. A. Martynyuk (Ukraine), I. P. Stavroulakis (Greece),
and I. Pournaras (Greece).*