1035-45-386   **Yuri Yatsenko*** (`yyatsenko@hbu.edu`), 7502 Fondren, Houston, TX 77074, and **Natali Hritonenko** (`nahritonenko@hbu.edu`), Box 0519, Prairie View, TX 77446. *Discrete and Continuous Optimization of Asset Replacement in Economics and OR.*

Vintage capital models of the economic growth theory describe optimal capital replacement under technological change and various restrictions on production, resources, and the environment. Such models are represented by non-linear Volterra integral equations with unknowns in the lower limits of integration. In Operations Research, similar processes of asset replacement are usually modeled in discrete time as integer programming problems. These two alternative techniques describe the same controlled dynamic process and possess their own theories. The talk analyzes continuous and discrete replacement models and explores connections between them. The authors develop a new innovative methodology to analyze the replacement dynamics under technological change. Such issues as the dynamics of optimal lifetime, the impact of technological change, finite and infinite-horizon optimization, single- and multi-machine replacement, energy and resource factors, nonlinear utility, discontinuous technical progress, and technological breakthroughs are discussed. In particular, it is proven that both continuous and discrete replacement models lead to the same nonlinear integral equations of a new type for optimal asset lifetime. It greatly simplifies the original control problems. (Received September 05, 2007)