A Difference - Differential Analogue of the Burgers Equation and Schumpeterian Dynamics

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Abstract : The talk contains a survey of results related to the following difference-differential equation :

$$(*) \qquad \frac{dF_n}{dt} = \phi(F_n)(F_{n-1} - F_n)$$

where, for every t, $\{F_n(t), n = 0, 1, 2, \ldots\}$ is a probability distribution function and ϕ is a positive function on $[0, 1]$.

The equation $(*)$ arises as a simplified description of economic development taking into account creation and propagation of new technologies in an industry or cross-country technology transfers. It may be considered as an analogue of the Burgers equation. If ϕ is decreasing then any solution of the Cauchy problem for $(*)$ approaches to a wave-train. For a non-monotonic case any solution approaches with time to a sum of diffusion curves and wave trains moving with different speeds. We discuss a number of modifications and unsolved problems including a multi-dimensional generalization of $(*)$ as well as applications to the economic growth and inter-country convergence theories.