

1137-35-117

Olga Alekseevna Rumyantseva* (olga.rumyantseva@wsu.edu), 14204 NE Salmon Creek Ave, Vancouver, WA 98686, and **Nick Strigul**. *Structural stability of the Perfect Plasticity Approximation (PPA) model.*

The Perfect Plasticity Approximation (PPA) is system of a macroscopic system of equations that predicts the large-scale dynamics of forest stands. The model is computationally efficient and is employed to scaling of vegetation dynamics and carbon and nutrient cycles using parameter values and functional forms of individual tree species. The model includes the system of McKendrick–von Foerster partial differential equations (one for every tree species) and an integral equation (the PPA equation). The McKendrick–von Foerster equation is a conservation law-based first-order hyperbolic partial-differential equation similar to the advection or transport equations that can be solved using the method of characteristics; however, the non-linear PPA integral equation presents a substantial challenge. In this presentation we will discuss structural stability of the PPA model, including the observed tendency of trees with particular shapes to produce unstable canopies. We will introduce analytic conditions of canopy stability and analyze oscillations that PPA predicts for an arbitrary crown shapes. (Received January 30, 2018)