

Research plan (Minoru Tabata)

The 2008 *Nobel Prize in Economics* was awarded to Paul Krugman for his work on spatial economics. The central mathematical model is a spatial evolution game called the *Dixit-Stieglitz-Krugman model*. This game is represented by a new replicator equation of the non-linear partial differential and integral equation type. It is expected to be applied to the simulation of rapid population movements caused by earthquakes and immigration inflows. Minoru Tabata proves the following two conjectures.

Conjecture 1: If there is a rapid outflow or inflow of population in a single connected region, the population will disappear in one sub-region and at the same time the population density converges to a delta function in the sense of distribution in another sub-region.

Conjecture 2. If the wage density and the transport costs are sufficiently low in the neighborhood of a point, the population will fall to zero in finite time in the neighborhood of that point and the population density will increase exponentially at a finite number of points.

