

Talks by Hans Weinberger.

Seminar talk, Nov. 14

Title: On the spreading speeds of a cooperative truncated linear discrete-time recursion model.

Abstract: The determination of the spreading speeds of a cooperative model for the growth and spread of a number of cooperating species can sometimes be reduced to finding the spreading speed of a discrete-time recursion in which the recursion operator is replaced by the truncation of a linear operator. A 2002 joint paper of the author with M. Lewis and B. Li claimed to give an explicit formula for the spreading speeds of such an operator. A gap in the proof of this result has recently been found. We shall present an extra hypothesis on the linear operator which makes the formula correct. We shall also present an example to show that the result is false without an extra hypothesis.

Colloquium talk, Nov. 15

Title: Some models for ecological invasions

Abstract: This lecture will introduce some properties of the solutions of a class of multispecies systems which model ecological invasions. The basic form of the system is a discrete-time recursion

$$\mathbf{u}_{n+1} = Q[\mathbf{u}_n].$$

Here Q is a translation-invariant monotone nonlinear operator on the class of continuous nonnegative vector-valued functions $\mathbf{u}(x)$ on an infinite habitat. If there is only one space dimension, then under a few conditions on Q it is shown that such a system has two asymptotic spreading speeds $c^* \leq c_+^*$ with the property that for any solution \mathbf{u}_n whose initial data \mathbf{u}_0 vanish for all sufficiently large x no component spreads more slowly than c^* , no component spreads more rapidly than c_+^* , and these bounds are sharp.

The existence of traveling wave solutions $\mathbf{w}(x - nc)$ for every $c \geq c^*$ and the extension to higher space dimensions will also be discussed.