1035-37-209 **Morris W Hirsch*** (mwhirsch@chorus.net), 7926 Hill Point Road, Cross Plains, WI 53528.
Existence, uniqueness and asymptotic phase in the carrying simplex for certain competitive maps.

X is a star-shaped neighborhood of 0 in $\mathbf{R}^n_+$. The vector order in any face $F \subseteq \mathbf{R}^n_+$ is denoted by $\leq_F$. Let $T : X \to X$ be continuous and map $X \cap F$ into itself for each open face F, including $\mathrm{Int}(\mathbf{R}^n_+)$. A compact invariant set $\Sigma \subset X$ is a *carrying simplex* if it attracts all trajectories except the origin and meets every line through the origin in $\mathbf{R}^n$ in a unique point.

Theorem: Assume: T is strictly sublinear, $x <_F y$ if $Tx \ll_F Ty$, and the origin is in the interior of the compact global attractor. Then there is a unique carrying simplex Σ, it is unordered, and every trajectory except the origin is asymptotic with a trajectory in Σ.

Examples with $T = (T_1, \ldots, T_n) : \mathbf{R}^n_+ \to \mathbf{R}^n_+$:

(1) $T_i(x) = x_i \exp\left(B_i - \sum_j A_{ij} x_j\right)$, where $B_i, A_{ij} > 0$ and $\sum_j \frac{B_i A_{ij}}{A_{ii}} < 1$

(2) $T_i(x) = \frac{C_i x_i}{1 + \sum_j A_{ij} x_j}$, where $A_{ij} > 0$ and $1 < C_i < 1 + \frac{A_{ii}}{\sum_j A_{ij}}$

(3) The Poincaré map of certain competitive periodic systems of differential equations in $\mathbf{R}^n_+$. (Received August 19, 2007)