1035-35-1073 **Peter Takac*** (peter.takac@uni-rostock.de), Institute for Mathematics, University of Rostock, Universitaetsplatz 1, D - 18055 Rostock, Germany. *Two Applications of Monotone Systems to Quasilinear Elliptic Problems.*

We consider the following quasilinear elliptic problem,

$$\text{(P)} \qquad -\Delta_p u = \lambda\, |u|^{p-2} u + f(x) \quad \text{in } \Omega; \qquad u = 0 \quad \text{on } \partial\Omega,$$

and a strictly cooperative system of such equations. Here, Ω is a smooth, open bounded domain in $\mathbb{R}^N$ and $\Delta_p u$ denotes the p-Laplace operator, $1 < p < \infty$. The real number λ is a spectral parameter. Given a function $f \in L^\infty(\Omega)$, $f \geq 0$, we investigate the existence, uniqueness, and positivity of a weak solution $u \in W_0^{1,p}(\Omega)$ to problem (P). In the first part we concentrate on the existence and simplicity of the first (smallest) eigenvalue λ_1 for both, the single equation (P) and a strictly cooperative system of such equations. We apply a method using the monotonicity and the part metric. In the second part we discuss the strong comparison principle for problem (P). For $1 < p \leq 2$ we use monotone dynamics of a cooperative system of two ODE's to show this principle for the radially symmetric problem in a ball, $f \geq 0$, and $\lambda < \lambda_1$. For $2 < p < \infty$ we give a simple counterexample for such a problem if λ is large negative. (Received September 18, 2007)