1077-35-1771 **Rushun Tian*** (rushun.tian@aggiemail.usu.edu), Department of Mathematics and Statistics, Utah State University, Logan, UT 84322, and **Zhi-Qiang Wang**. *Multiple Solitary Wave Solutions of Nonlinear Schrödinger Systems.*

We study the solitary wave solutions of the following system of nonlinear Schrödinger equations,

$$\begin{cases} -\Delta U_j + U_j = \mu U_j^3 + \beta U_j \sum_{k\neq j} U_k^2, & \text{in } \Omega, \\ U_j > 0 \text{ in } \Omega, U_j = 0 \text{ on } \partial\Omega, & j = 1, \cdots, N. \end{cases}$$

Here $\mu > 0$ and $\beta < 0$ are constants; Ω is a smooth and bounded (or unbounded if Ω is radially symmetric) domain in $\mathbb{R}^n$, $n \leq 3$.

Using a Lusternik-Schnirelmann type theory and a Z_N-index, we prove the existence of multiple Z_N-orbits of solutions on different energy levels. The parameter β plays an important role in this process, and its value is used to estimate the number of solution orbits. (Received September 20, 2011)