1113-35-148 **Alfonso Castro*** (castro@g.hmc.edu), Mathematics, Harvey Mudd College, Claremont, CA 91711, and **Ivan Ventura**. *Existence of augmented Morse index 3 solution for a semilinear boundary value problem.* Preliminary report.

Let Ω be a bounded region in $\mathbb{R}^N$. Let $f : \mathbb{R} \to \mathbb{R}$ be a differentiable function such that $f(0) = f'(0) = 0$, $f'(t) > f(t)/t$ for $t \neq 0$, and there exists $A > 0$ and $p \in (1, (N+2)/(N-2)$ such that $|f'(t)| \leq A(|t|^p + 1)$ for all $t \in \mathbb{R}$. The boundary value problem $\Delta u + f(u) = 0$ in Ω, $u = 0$ on the boundary of Ω has two Morse index 1 solutions and a Morse index 2 solution that changes sign exactly once. We prove that when a sublevel of the functional $J(u) = \int_\Omega \|(\nabla u\| - 2F(u))dx$, $F(u) = \int_0^u f(s)ds$, on the *equator of the Nehari Manifold* has nontrivial topology, an augmented Morse index 3 solutions exists. We provide examples of regions Ω for which this assumption applies. (Received August 18, 2015)