1015-53-267   **Santiago Simanca*** (`santiago@math.unm.edu`), Department of Mathematics and Statistics, Universtiy of New Mexico, NM 87131. *Optimal Immersions.* Preliminary report.

Consider a closed Riemannian manifold $(\tilde{M}, \tilde{g})$, and let (M, g) be an immersed submanifold endowed with the induced metric g from that on the ambient space. Let α be the second fundamental form, a symmetric two-tensor over M with values in the normal bundle. We consider the functional $\int_M \|\alpha\|^2 d\mu_g$ over the space of all immersions of M into the ambient space that represent a fixed homology class, and derive its Euler-Lagrange equation under isometric deformations. We describe basic properties of the critical points in codimensions one and two, respectively, and present examples. In particular, we show that a degree d curve in $\mathbb{CP}^n$ is a critical point. We outline a program that intends to use this result to show that, among all embedded representatives of the homology class of this curve in $\mathbb{CP}^2$, the complex representative achieves the lowest possible genus (this a theorem of Kronheimer-Mwroka whose only known proof uses the theory of Seiberg and Witten). (Received February 07, 2006)