1023-83-372 **Gabriel Nagy** and **Olivier Sarbach*** (sarbach@ifm.umich.mx), Instituto de Fisica y Matematicas, U, Universidad Michoacana, Edificio C-3, Ciudad Universitaria, 58040 Morelia, Mexico. *A minimization problem for the lapse and the initial-boundary value problem for Einstein's field equations.*

We discuss the initial-boundary value problem of General Relativity. Previous considerations for a toy model problem in electrodynamics motivate the introduction of a variational principle for the lapse with several attractive properties. In particular, we show that the resulting elliptic gauge condition for the lapse together with a suitable condition for the shift and constraint-preserving boundary conditions yields a priori estimates on the metric, connection and curvature fields. These estimates are expected to be useful for obtaining a well posed initial-boundary value problem for metric formulations of Einstein's field equations which are commonly used in numerical relativity.

To present a simple and explicit example we consider the 3+1 decomposition introduced by York of the field equations on a cubic domain with two periodic directions and prove in the weak field limit that our gauge condition for the lapse, an a priori specified shift vector and our boundary conditions lead to a well posed problem. The method discussed here is quite general and should also yield well posed problems for different ways of writing the evolution equations, including first order symmetric hyperbolic or mixed first-order second-order formulations. (Received September 09, 2006)