1010-31-42          **Tatiana Savin\*** (`savinat@cns.physics.gatech.edu`), School of Physics, Georgia Institute of Technology, 837 State Street, Atlanta, GA 30332-0430, and **Boris Sternin** and **Victor Shatalov**. *On a finite algorithm of constructing mother bodies in $R^2$.*

The problem of analytic continuation of solutions to elliptic differential equations dates back to Schwartz, Herglotz and Poincare. One of the classical statements of this problem is related to inverse problem of geoprospecting and could be stated as follows. *Given a body $D$ with a known mass distribution. Find a smaller body $D_1$ generating the same gravitational field outside $D$.*

In this talk we discuss the problem of constructing a minimal element, mother body, for a family of bodies producing the same external gravitational field, i.e. a body, whose support has Lebesgue measure zero and satisfies some additional requirements. We suggest the finite algorithm of constructing mother bodies in $R^2$ and investigate its (mother body's) local structure near singular points of the continued logarithmic potential. (Received August 08, 2005)