1106-49-738 **Luis A Melara*** (lamelara@ship.edu), 1871 Old Main Drive, Shippensburg, PA 17257-2299, and **Edray Goins**, **Alejandra Alvarado**, **Karoline Pershell**, **Emille Lawrence** and **Naiomi Cameron**. *Numerical Approximation of Coefficients of Beylĭ Maps.* Preliminary report.

In 1984, Alexander Grothendieck, inspired by a result of Gennadiĭ Belyĭ from 1979, constructed a finite, connected planar bipartite graph via rational functions $\beta : \mathbb{P}^1(\mathbb{C}) \to \mathbb{P}^1(\mathbb{C})$ with critical values $\{0, 1, \infty\}$ by looking at the inverse image of the triangle formed by these three points. He called such graphs Dessins d'Enfants. Conversely, Riemann's Existence Theorem implies that every finite, connected planar graph arises in this way.

The difficulty arises in explicitly constructing such a Belyĭ map β from any given planar graph. We may form a valency list by considering the number of edges surrounding each vertex and each face; this forces algebraic conditions on the coefficients of the desired Belyĭ map. Hence the construction of a Belyĭ map can be reduced to the computation of roots of a system of nonlinear equations. In this talk, we reformulate the problem of finding these roots into an unconstrained optimization problem. We implement Newton's method and a Trust-Region Method to approximate these coefficients. Preliminary results are presented and possible directions are discussed. (Received September 05, 2014)