1046-53-1585 **K.-D. Semmler*** (klaus-dieter.semmler@epfl.ch), EPFL-SB-IGAT, Station 8, 01004 Lausanne, Switzerland. *Hyperbolic Polygons, Fuchsian groups and Helling Matricies.*

We will show the usage of linear algebra for hyperbolic geometry and Fuchsian groups. Even though we might get not as much milage out of linear algebra in this context as euclidian geometry has for centuries, it is in our view a very promising approach. Many properties in hyperbolic geometry have a strikingly easy formulation and proofs in this language. Furthermore for algorithmic and numeric purposes this way of looking at hyperbolic geometry and discreteness seems to us the most efficient way.

First we give some examples of geometric facts about polygons to show how linear algebra works for us. Then we interpret polygons as systems of generators of groups and study discreteness and quotients for simple cases, in particular genus 2, (1,2), and 3. Finally we propose some algorithms for moving around in Teichmüller space to get geometric information like systoles and Bers' constants. (Joint work with Anthony Arnold (EPFL)). (Received September 16, 2008)