1077-74-1305 **Matthias Augustin*** (augustin@mathematik.uni-kl.de), University of Kaiserslautern, Department of Mathematics, P. O. Box 30 49, 67653 Kaiserslautern, Germany. *Stress field simulations in geothermal reservoirs.* Preliminary report.

It is a well known problem that the fossil fuel resources on earth are diminishing. New sources of energy, especially renewable ones, become more and more important. One of the most promising of these renewables is the heat stored in the earths crust which is used by so-called geothermal facilities. But as with every technology, there are not only benefits but also risks such as depletion of the reservoir, reducing of productivity or seismic events.

In order to minimize the risks, knowledge of the mechanical stresses within the reservoir is crucial. The stress field influences productivity of a reservoir via fracture stimulation as well as fracture growth and determines whether seismic events occur or not. In this talk, the underlying differential equations for modeling the stress field in rocks are presented. Based on these, boundary integral equations (BIE) are developed. These BIE are discussed and similarities to single and double layer approaches which are well-known for the Laplace equation are shown. Further on, numerical solution schemes to simulate stress fields in geothermal reservoirs will be introduced. (Received September 19, 2011)