1062-16-242 **Harm Derksen*** (hderksen@umich.edu), Department of Mathematics, 530 Church St, Ann Arbor, MI. *Representations of Algebras and the Graph Isomorphism Problem.*

For a given algebra R, it is relatively easy to determine whether two R-modules are isomorphic. The number of arithmetic operations in the base field needed is polynomial in n, where n is the dimension of the modules. Other isomorphism problems, such as the Graph Isomorphism are harder. It is not known whether two graphs can be tested for isomorphism in polynomial time. I will explain how the isomorphism problem for R-modules can be used to obtain an algorithm for the Graph Isomorphism Problem which is more powerful then the higher dimensional Weisfeiler-Lehman algorithm. (Received August 10, 2010)