1086-03-623 **Charles McCoy** (mccoy@up.edu), Mathematics Dept., University of Portland, 5000 N. Willamette Blvd., Portland, OR 97203-5798, and **Russell Miller*** (russell.miller@qc.cuny.edu), Mathematics Dept., Queens College - CUNY, 65-30 Kissena Blvd., Flushing, NY 11367. *Independent Sets in Computable Free Groups and Fields.* Preliminary report.

There is a strong analogy between the free group G on countably many generators and the purely transcendental field $F = \mathbb{Q}(X_1, X_2, \ldots)$. Two notions of basis are relevant. An independent set generating G is known as a *basis* for the group, while an independent set generating the field F is called a *pure transcendence basis*. In fields, the term *transcendence basis* denotes any maximal independent set, whether or not it generates F; the analogous notion for G is less common, and we simply call it a maximal independent set.

We establish various effectiveness properties of these notions in computable presentations of F and G. For F, the Turing degrees of transcendence bases form an upper cone above the degree of the dependence relation, which is always computably enumerable. In contrast, it is possible for a computable copy of G to have a computable maximal independent set, yet to have noncomputable dependence relation. When one considers independent generating sets, the situation changes: work of McCoy and Wallbaum established that for G, every computable presentation has a Π^0_2 basis, and that this bound is sharp, whereas for fields, many questions about the Turing degrees of pure transcendence bases remain open. (Received September 09, 2012)