1060-03-182   **Russell Miller*** (`Russell.Miller@qc.cuny.edu`), Mathematics Dept., Queens College, 65-30 Kissena Blvd., Flushing, NY 11367. *Comparing Free Abelian Groups and Purely Transcendental Fields.* Preliminary report.

In computable model theory, there are close connections between the notion of a basis for a computable abelian group and the notion of a transcendence basis for a computable field. Every such group has a Π_1^0 basis (that is, definable by a formula with only $\forall$-quantifiers), and every such field has a Π_1^0 transcendence basis; moreover, these constructions are essentially the same.

We consider the difficulty of computing a pure transcendence basis for a computable field F, i.e. a transcendence basis which generates F as a field over $\mathbb{Q}$ or over $\mathbb{F}_p$. The analogous question for abelian groups involves a basis which generates the entire group. Of course, the group must be free abelian, and the field purely transcendental, in order for the questions to make sense. The construction of a free generating set for a computable free abelian group does not carry over to computable fields, and we use computability theory to compare the difficulty of these two constructions.

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