1077-05-1931 **Wilfried Imrich*** (`imrich@unileoben.ac.at`), Gubattagasse 2, 8700 Leoben, Austria.
Conjectures reaching from groups and graphs to graphs and groups.

In 1957 Hanna Neumann proved that for non-trivial subgroups U, V of finite ranks $r(U), r(V)$ in a free group

$$r(U \cap V) - 1 \leq 2(r(U) - 1)(r(V) - 1).$$

She conjectured that the factor 2 is superfluous.

We outline a graph-theoretic proof of her result. The proof, using a construction similar to the direct product of graphs, makes some generalizations of the conjecture plausible.

The second conjecture concerns the direct product of graphs. Although the prime factorization of finite connected nonbipartite graphs is unique, this is not so for bipartite graphs. Hammack conjectures that every finite connected bipartite graph has a unique bipartite prime factor. He proves it if this factor is K_2.

The last conjectures pertain to the Distinguishing number $D(G)$ of a graph, that is, the smallest number of colors needed to color the vertices so that only the identity automorphism preserves all colors.

It is known that the Radon graph has distinguishing number 2. Here new types of uncountable random graphs are defined. We conjecture that they also have distinguishing number 2.

The fourth conjecture states that for infinite cardinals n, m, where $n < m < 2^n$, the distinguishing number of the Cartesian product of K_n with K_m is 2. (Received September 21, 2011)