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Justin Amery James* (jjames@math.unl.edu), 2201 Ryons St., Lincoln, NE 68502. *Deciding Membership in Finitely Generated Submonoids of the Free Product of two Groups.*

We show that there is an algorithm to decide membership in finitely generated submonoids of the free product $G_1 * G_2$ of two finitely generated groups, provided there is an algorithm to decide membership in rational subsets of each of the groups G_i . This extends a result of K. A. Mihailova, who proved that the generalized word problem is decidable in the free product of two groups provided it is decidable in each of the factors. Since Rational Membership is known to be decidable for Free Groups, Free Abelian Groups, Virtually Free Groups, and Virtually Free Abelian Groups, our algorithm can be used to decide membership in finitely generated submonoids of a free product of two groups drawn from any of these classes of groups. (Received September 27, 2005)