1086-VQ-2389 **Horia I Petrache*** (hpetrach@iupui.edu), 402 N. Blackford St., LD154, Physics, IUPUI, Indianapolis, IN 46202. *Coset extensions of real numbers.*

The set of real numbers is extended by using the concept of coset products from group theory. This approach is intended for students with minimal knowledge of group theory but with an interest in number systems. In algebra over fields, various extensions of real numbers are obtained by choosing a base and by specifying multiplication rules for basis elements. Such constructions give rise to the usual complex numbers, quaternions, and so forth. However, the choices of multiplication rules (including the values for structure coefficients) appear ad hoc. Here it is shown that multiplication rules and structure coefficients are obtained naturally from coset group closure and exhaust all possibilities of hypercomplex numbers. The cases corresponding to small groups generating 2, 3, and 4 dimensional number systems will be shown as examples. (Received September 25, 2012)