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Robert W. Benim* (rwbenim@ncsu.edu), NCSU Mathematics Department, 2108 SAS Hall, Box 8205, Raleigh, NC 27695, **Aloysius Helminck** (loek@ncsu.edu), NCSU Mathematics Department, 2108 SAS Hall, Box 8205, Raleigh, NC 27695, **Chris Dometrius**, Forsyth Technical Community College, 2100 Silas Creek Parkway, Winston-Salem, NC 27103, and **Ling Wu**. *Inner Involutions of $SO(n, k, \beta)$, ($n > 2$).*

A first characterization of the isomorphism classes of k -involutions for any reductive algebraic groups defined over a perfect field was given in [Helminck 2000] using 3 invariants. In [Dometrius, Helminck, Wu] a classification of all involutions on $SL(n, k)$ for k algebraically closed, the real numbers, the p -adic numbers or a finite field was provided. In this paper, we build on these results to develop a detailed characterization of the involutions of $SO(n, k, \beta)$, where β is any non-degenerate symmetric bilinear form. We use these results to classify the isomorphy classes of inner-involutions of $SO(n, k, \beta)$ where k is any field not of characteristic 2 or 3, and for some β where k is characteristic 3. (Received June 25, 2013)