962-81-1354   **Imre Tuba** (`ituba@math.ucsb.edu`), Mathematics Department, University of California, Santa Barbara, Santa Barbara, CA 93106. *Low-Dimensional Braid Representations.*

We have classified all simple representations of the braid group B_3 with dimension $d \leq 5$ over any algebraically closed field. In particular, we proved that a simple d-dimensional representation is determined up to isomorphism by the eigenvalues of the image of the two braid generators and a choice of a root of their product for $d = 4$ and 5. We also showed that such representations exist whenever the eigenvalues are not zeros of certain explicitly given polynomials and constructed the matrices via which the generators act.

We have found a necessary and sufficient condition for the unitarizability of simple representations of B_3 of dimension $d \leq 5$. In particular, we showed that a simple representation is unitarizable if and only if the eigenvalues are distinct of norm 1, and satisfy certain inequalities, which can be computed explicitly.

We have used these results to compute categorical dimensions of objects in braided tensor categories. Kazhdan and Wenzl characterized tensor categories of Lie type A, using Hecke algebras. We expect to use these results in classifying braided tensor categories whose Grothendieck semiring is isomorphic to the one of the representation category of a classical Lie group or one of its associated fusion categories. (Received October 03, 2000)