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Title: *Isoparametric Hypersurfaces with Four Principal Curvatures*

Abstract: Let M be an isoparametric hypersurface in the sphere S^n with four distinct principal curvatures. Münzner showed that the four principal curvatures can have at most two distinct multiplicities m_1, m_2 , and Stolz showed that the pair (m_1, m_2) must either be $(2, 2)$, $(4, 5)$, or be equal to the multiplicities of an isoparametric hypersurface of FKM-type, constructed by Ferus, Karcher and Münzner from orthogonal representations of Clifford algebras. In this paper, we prove that if the multiplicities satisfy $m_2 \geq 2m_1 - 1$, then the isoparametric hypersurface M must be of FKM-type. Together with known results of Takagi for the case $m_1 = 1$, and Ozeki and Takeuchi for $m_1 = 2$, this handles all possible pairs of multiplicities except for 4 cases, for which the classification problem remains open.