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Title: Exceptional Legendre polynomials and confluent Darboux transformations

Abstract: Exceptional orthogonal polynomial systems (X-OPS) arise as eigenfunctions of Sturm-Liouville problems and generalize the classical families of Hermite, Laguerre and Jacobi. In this talk we will see how to construct exceptional Legendre families via confluent chains of Darboux transformations, which cannot be obtained by the standard method. This construction shows that there exists a vast unexplored class of exceptional polynomial familes that fall outside of the current classification scheme based on Darboux-Crum transformations indexed by a single partition (X-Hermite) or a pair of partitions (X-Laguerre and X-Jacobi).

This is a joint work with David Gómez-Ullate and Robert Milson.