1041-60-184 **F. Alberto grunbaum*** (`grunbaum@math.berkeley.edu`), Alberto Grunbaum, Math Dept UC Berkeley, berkeley, CA 94720. *Matrix valued orthogonal polynomials and inverse problems for networks.*

Consider a network with known topology, and on it consider a Markov chain with nearest neighbour UNKOWN transition probability matrix P. An extension of the well known Karlin-McGregor expression for the n-step transition matrix, in terms of Krein matrix valued orthogonal polynomials, allows one to pose and in some cases solve the INVERSE PROBLEM of determining P from certain "boundary measurements". This can be seen as a discrete version of the problem of diffuse tomography that originates in medical and geophysical imaging. (Received August 11, 2008)