AFFINE SPHERES:
DISCRETIZATION VIA DUALITY RELATIONS

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Abstract. Affine spheres with definite and indefinite Blaschke metric are discretized in a purely geometric manner. The technique is based on simple relations between affine spheres and their duals which possess natural discrete analogues. The geometry of these duality relations is discussed in detail. Cauchy problems are posed and shown to admit unique solutions. Particular discrete definite affine spheres are shown to include regular polyhedra and some of their generalizations. Connections with integrable partial difference equations and symmetric mappings are recorded.