Title:	Lattices in Euclidean space
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Abstract:	A lattice L is a finitely generated Z-submodule of a vector space such that it contains a basis of the vector space over Q. Given a bilinear form on L, we define a quadratic form Q(x) on the lattice. A lattice L is said to be positive lattice if Q(x) > 0 for all x □ RV /{0}. If L and M are positive lattices, we can define the tensor product L □ M which is also a positive lattice. We define the min(L) for a positive lattice to be the min{Q(x)|x □ L/{0}}. Then min(L □ M) ≤ min(L)min(M). The natural question is when does the equality hold. The equality holds for every M, if L is of E-type. We'll explore these special lattice and their properties. The second part of my thesis is regarding scalar extension of lattices. Let L and M be two positive lattices, F be a finite extensions of Q and R F , the ring of integers of F. Then R F □ L is called the scalar extension of L. Assume there exists an isometry σ such that σ (L) = M. Then σ is also an isometry between the scalar extensions of lattices, i.e. σ (R F □ L) = R F □ M. The interesting questions is, assume there exists an isometry between the scalar extension of lattices. When does the isometry passes down to lattices?
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