1016-52-127 **Ellen Veomett*** (`eveomett@umich.edu`), University of Michigan, 2074 East Hall, 530 Church Street, Ann Arbor, MI 48109-1043. *Positive Semidefinite Approximations of Convex Bodies.*

Given an arbitrary convex body X, we construct a hierarchy of convex sets $P_1, P_2, \ldots$ each contained in X. Every P_k is obtained as an intersection of a cone of positive semidefinite quadratic forms with an affine space. If $X \subset \mathbb{R}^n$ is a 0-1 polytope, we can show that $P_n = X$, similar to construction results of Lasserre, Lovász and Schrijver, and Sherali and Adams. In the case where X is the traveling salesman polytope on n cities T_n, we can give metric bounds on the approximation. Namely, we show that if $k \leq \lfloor \frac{n}{2} \rfloor$ then the scaling of P_k by $\frac{n}{k} + O\left(\frac{1}{n}\right)$ contains T_n. Membership in P_k is computable in time polynomial in n, the degree of the polynomial linear in k. We also discuss facets of the traveling salesman polytope which lie on the boundary of P_k. (Received February 07, 2006)