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Sinai Robins* (srobins@temple.edu), 4302 Boone street, Philadelphia, PA 19128. *Polyhedral theta functions, polyhedral Gauss sums, and extensions of the Gram relations for polytopes.*

We extend the famous Gram relations for solid angles of a polytope P : $\sum_{F \in P} (-1)^{\dim F} \omega_F = 0$. We will first cover a little of the history of solid angles, especially as they relate to polytopes, and then show how to extend their Gram relations, using asymptotics of our polyhedral theta functions. Some of the new ingredients are polyhedral Gauss sums, and polyhedral theta functions. Everything will be defined from first principles. (Received January 23, 2007)