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Universal Lower Bounds (ULB) on Energy of Spherical Codes

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We derive and investigate lower bounds for the potential energy of finite spherical point sets (spherical codes). Our bounds are optimal in the following sense – they cannot be improved by employing polynomials of the same or lower degrees in the Delsarte-Yudin method. However, improvements are sometimes possible and we provide a necessary and sufficient condition for the existence of such better bounds. All our bounds can be obtained in a unified manner that does not depend on the potential function, provided the potential is given by an absolutely monotone function of the inner product between pairs of points, and this is the reason for us to call them universal.

Results presented are joint works with P. Boyvalenkov, P. Dragnev, D. Hardin, and M. Stoyanova.