# Higher-order convex bodies and related inequalities

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**Abstract**

I will discuss parts of a series of joint works with J. Haddad, D. Langharst, E. Putterman, and D. Ye, which concern the examination of classical notions of convex geometry in a "higher-order" setting. To a convex body $K$ may operators may be assigned, such as the difference body, projection body, and centroid body operators. In this talk, I will describe methods of assigning to a convex body $K$ in $\mathbb{R}^n$ convex bodies in dimension $\mathbb{R}^{nm}$ which extend the usual notion of difference body, projection body and centroid bodies. As a consequence, various affine-isoperimetric inequalities and Sobolev-type inequalities, one of which is stronger than the usual isoperimetric inequality, arise in this setting. Since this topic is completely new in the subject, there are still many open questions to consider concerning these new operators.