

# Rotational Crofton formulae with a fixed subspace

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Consider the classical Crofton formula for a convex body  $K$  in  $n$ -dimensional Euclidean space. It states that any intrinsic volume (apart from the Euler-Poincaré characteristic) can be obtained integrating a measurement function (another intrinsic volume) of sections of  $K$  with a flat that is moved invariantly in space. A variant, the so-called rotational Crofton formula, has already been established in the literature. Here the flat is a *linear* space, and the invariant integration extends over all proper rotations. A combination of the classical Crofton integral with Blaschke–Petkantschin formulae allows us to derive new rotational Crofton formulae in which the invariant integration is over all linear flats containing a fixed subspace. This leads to new measurement functions which behave differently than the ones in the rotational Crofton formula. We then study these measurement functions in detail and show that they reduce to known functions in specific cases.