

GROUP-INVARIANT SEPARATING POLYNOMIALS ON A BANACH SPACE

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Abstract: We study the group-invariant continuous polynomials on a Banach space X that separate a given set K in X and a point z outside K . We show that if X is a real Banach space, G is a compact group of $\mathcal{L}(X)$, K is a G -invariant set in X , and z is a point outside K that can be separated from K by a continuous polynomial Q , then z can also be separated from K by a G -invariant continuous polynomial P . It turns out that this result does not hold when X is a complex Banach space, so we present some additional conditions to get analogous results for the complex case. We also obtain separation theorems under the assumption that X has a Schauder basis which give applications to several classical groups. In this case, we obtain characterizations of points which can be separated by a group-invariant polynomial from the closed unit ball.

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Key words: group-invariant, separation theorem, polynomials, Banach space.