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Equivariant correspondences and applications

We describe the Kasparov group $\mathrm{KK}^G(X, Y)$ in terms of a group $\mathrm{KK}^G_{\mathrm{geom}}(X, Y)$ of equivalence classes of correspondences from X to Y. Here G is an infinite discrete group and X is a *proper* G-space and we assume that both X and Y are manifolds. The description requires some discussion of equivariant K-theory groups and in particular when they can be described in terms of equivariant vector bundles. The proof that the geometric and analytic groups coincide is by Kasparov duality.