Weighted b-functions for $\mathcal{D}$-modules

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b-functions have a long history in the theory of $\mathcal{D}$-modules. Usually, a b-function is a polynomial associated to a $\mathcal{D}$-module and a smooth subvariety. However, they do not always behave well under inverse image, for example under a ramification map. We will introduce "weighted" b-functions to solve this problem and show how they appear in a natural way in some problems of Lie groups.