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Topology of character varieties and
the character ring of finite general linear groups.

We are interested in the mixed Hodge polynomial for the intersection cohomology of representation varieties of punctured Riemann surfaces with Zariski closure of conjugacy classes of $GL(n, \mathbb{C})$ at the punctures. We conjecture that these mixed Hodge polynomials interpolate the constant structures of two rings: one is the character ring of $GL(n, q)$ and the other one is equipped with convolution product and with basis the characteristic functions of intersection cohomology complexes on Zariski closures of conjugacy classes. This process of going from one ring to the other one by deformation can be seen as a kind of (non-abelian) Fourier transforms. Indeed, in the Lie algebra setting the analogous deformation (where the character variety is replaced by a certain quiver variety with pure mixed Hodge structure) is trivial, i.e., the two analogous rings are isomorphic and the isomorphism is realized by a true Fourier transform.