Monopole - spectral flow correspondence from condensed matter to geo-astrophysical flows

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Abstract

Spectral flows constitute probably the most universal signature of a topological property in physical systems. They arise in a large variety of situations: from interface states in Chern insulators and chiral current in Weyl semimetals, to unidirectional waves in atmospheres, oceans or even stars. From a more formal point of vue, spectral flows are in direct correspondence with a "Berry-Chern" monopoles, namely the Chern numbers quantifying the Berry flux generated by degeneracy points in phase space. In this talk, I would like to present some of the mathematical and physical aspects of this correspondence, and discuss its relation with the celebrated bulk-edge correspondence.