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Regularizations of residue currents

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Abstract

Let f and g be holomorphic functions defined on some complex n-manifold X and assume that f and g define a complete intersection, i.e. that $\{f = g = 0\}$ has codimension 2. The residue function $\mathbb{R}^2_+ \ni (\epsilon_1, \epsilon_2) \mapsto \int_{V_\epsilon} \varphi/(fg)$, where $V_\epsilon = \{|f|^2 = \epsilon_1, |g|^2 = \epsilon_2\}$ and $\varphi \in \mathcal{D}_{n,n-2}(X)$, is in general discontinuous at the origin according to an example by Passare and Tsikh. By considering their example I will show how one can recover continuity by taking a certain average. The value at zero is the Coleff-Herrera residue current associated to (f, g). I will also briefly discuss more general regularizations of Cauchy-Fantappiè-Leray type currents. Finally I would like to indicate a connection between residue currents and operator calculus by considering a simple example.