

Topological charges for finite energy fields in a sigma-model

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In the (2+1)-dimensional classical $O(3)$ sigma-model, all finite energy fields have integer topological charges regardless of their asymptotic behavior at infinity. Topological charge is conserved for the fields with finite Euclidean action, without further assumptions on the field equations or asymptotics. The fields with continuous first derivatives as well as fields in Sobolev-like spaces analogical to $W^{1,2}$ are considered.