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Chern rank of complex bundle

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Abstract: Motivated by the work of A. C. Naolekar and A. S. Thakur (2014) we introduce notions of upper chern rank and even cup length of a finite connected CW-complex and prove that upper chern rank is a homotopy invariant. It turns out that determination of upper chern rank of a space X sometimes helps to detect whether a generator of the top cohomology group can be realized as Euler class for some real (orientable) vector bundle over X or not. For a closed connected d-dimensional complex manifold we obtain an upper bound of its even cup length. For a finite connected even dimensional CW-complex with its upper chern rank equal to its dimension, we provide a method of computing its even cup length. Finally, we compute upper chern rank of many interesting spaces.

Keywords: Chern class; characteristic rank; cup length; chern rank
AMS Subject Classification: 57R20

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