Professor: Alexander Givental

Math 215A: Algebraic Topology

Homework 12

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Question 1: On a closed manifold, suppose that the cup product of l cohomology classes $a_1, \cdots, a_l$ (with coefficients in Ring R) is non-zero. Prove that on this manifold, any function with only isolated (but not necessarily degenerate) critical points has at least $l+1$ *distinct* critical points.

Solution:

text

Question 2: For a CW Complex X, show that the addition in $H^n(X;G) = \pi(X, K(G,n))$ is induced by the map $K(G,n) \times K(G,n) \to K(G,n)$ defined as the composition of loops $K(G,n) = \Omega K(G, n+1)$.

Solution:

text

Question 3: Prove that two complex line-bundles over a CW-base are equivalent if and only if their first Chern classes coincide.

Solution:

text