THE MAYER – VIETORIS SEQUENCE CALCULATING DE RHAM COHOMOLOGY

Arben Baushi

University of Vlora "Ismail Qemali", Vlora, Albania, Email: baushiarben@gmail.com

Abstract

De Rham cohomology it is very obvious that it relies heavily on both topology as well as analysis. We can say it creates a natural bridge between the two. To understand and be able to explain what exactly de Rham cohomology is to the world of mathematics we need to know de Rham groups. This is the reasons to calculate the de Rham cohomology of a manifold. This is usually quite difficult to do directly. We work with manifold. Manifold is a generalization of curves and surfaces to arbitrary dimension. A topological space M is called a manifold of dimension k if :· M is a topological Hausdorff space . · M has a countable topological base.· For all $m \in M$ there is an open neighborhood U $\subseteq$ M such that U is homeomorphic to an open subset V of $\mathbb{R}^k$. There are many different kinds of manifolds like topological manifolds, $\mathbb{C}^k$ - manifolds, analytic manifolds, and complex manifolds, we concerned in smooth manifolds. A smooth manifold can described as a topological space that is locally like the Euclidian space of a dimension known. An important definion is homeomorphism. Let X, Y be topological spaces, and let f : X $\to$ Y be a bijection. If both f and the inverse function f^{-1}: Y $\to$ X are continuous, then f is called a homeomorphism We introduce one of the useful tools for this calculating, the Mayer – Vietoris sequence. Another tool is the homotopy axiom. In this material I try to explain the Mayer – Vietoris sequence and give same examples. A short exact sequence of cochain complexes gives rise to a long exact sequence in cohomology, called the Mayer - Vietories sequence. Cohomology of the circle (S^1), cohomology of the spheres (S^2). Homeomorphism between vector spaces and an open cover of a manifold. We define de Rham cohomology and compute a few examples.

Keywords: *Mayer – Vietoris sequence, De Rham cohomology, manifold, differential forms, diffeomorfic, exact, close forms, cohomology class*