

Quiz 1

January 30, 2013

Answer all the questions. Try to be as precise as possible.

We shall try to compute $H_{\Omega}^0(\mathbb{R}^2)$ and $H_{\Omega}^1(\mathbb{R}^2)$.

1. What are all the closed 1-forms on \mathbb{R}^2 ? The answer I am expecting is in terms of a partial differential equation. *(4 points.)*
2. What are all the exact 1 forms on \mathbb{R}^2 ? *(1 point.)*
3. Are all closed forms exact? (It is enough to give a way to solve the resulting partial differential equation. No need to check the solution is C^{∞} . Also you can assume that you can interchange the derivatives and the integrals.) *(2 points.)*
4. What can you say about $H_{\Omega}^1(\mathbb{R}^2)$? *(1 point.)*
5. What can you say about $H_{\Omega}^0(\mathbb{R}^2)$? *(2 points.)*