

Quiz 1

October 26, 2012

Total time: 15 minutes.

Exercise 1. Let $M = GL(2, \mathbb{R})$. Define an 1-parameter action on M by

$$\theta(t, A) = \begin{pmatrix} 1 & t \\ 0 & 1 \end{pmatrix} A, \quad A \in GL(2, \mathbb{R}),$$

where the multiplication is the usual matrix multiplication.

- (1) Show that θ is a 1-parameter group action. (1 point.)
- (2) Find the infinitesimal generator. (2 points.)

Exercise 2. Let $X = x \frac{\partial}{\partial y}$ be a vector field on $M = \mathbb{R}^2$. Find W and $\theta : W \rightarrow M$ defining a local 1-parameter subgroup whose infinitesimal generator is X . (2 points.)