FORMAL GROUP LAWS BY BUCHSTABER, KRICHEVER AND NADIRADZE COINCIDE

Malkhaz Bakuradze

email: malkhaz.bakuradze@tsu.ge

Mathematics department, Ivane Javakhishvili Tbilisi State University

Let $F(x,y)$ be the formal group law of geometric cobordism [6]. Following Quillen [7] we will identify it with the universal Lazard formal group law. Let $\omega(x) = \frac{\partial F(x,y)}{\partial y}(x,0)$.

In [3] V. M. Buchsteber has given the analytical solution of a functional equation for the exponent of the formal group law of the form

$$F_B = F_B(x,y) = \frac{A(y)x^2 - A(x)y^2}{B(y)x - B(x)y}.$$

Let us now present a minor modification of the analysis of F_B performed in [5] and to introduce

$$A(x,y) = \sum A_{ij}x^i y^j = F(x,y)\big(x\omega(y) - y\omega(x)\big).$$

We define the universal Nadiradze formal group law F_N by the obvious classifying map of the Lazard ring to its quotient ring by the ideal generated by all A_{ij} with $i,j \geq 3$.

In order to compute the Krichever genus on the coefficients of the formal group law of geometric cobordism in [4] the universal Krichever formal group law F_{Kr} is defined as

$$F_{Kr}(x,y) = xb(y) + yb(x) + b(0)xy + \frac{b(x)\beta(x) - b(y)\beta(y)}{xb(y) - yb(x)},$$

where $\beta(x) = \frac{b'(x) - b'(0)}{2}$ and $b(x) = \frac{\partial F_{Kr}(x,y)}{\partial y}(x,0)$.

Our main result is the following (to appear in Russian Mathematical Surveys)

Proposition. One has $F_B = F_{Kr} = F_N$, and the coefficient ring is the the quotient of the Lazard ring by the ideal generated by all A_{ij} with $i,j \geq 3$.

References

[1] M. Bakuradze and M. Jibladze, *Proc, A. Razmadze Math Inst.* 159, (2012) 1-9.

[2] Victor Buchstaber, Taras Panov, and Nigel Ray, *Intern. Math. Research Notices,* vol 2010 no. 16, 3207-3262.

[3] V. M. Buchstaber, *UMN*, 45, 3(273), (1990)185-186.

[4] V. M. Buchstaber, E.Yu. Bunkova, *Funct. Anal. and appl.* 45:2, (2011)23-44 .

[5] R. Nadiradze, *Formal group and cohomology theories, Dissertation for the Doct. of Sci. Degree*, Tbilisi 1995.

[6] S. P. Novikov, Math. *USSR-Izv.* vol 1, issue 4 (1967)827-913.

[7] D. Quillen, *Dull. Amer. Math. Soc.* 75 (1969)1293-1298.