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Corrigendum

Corrigendum to "Classification of solvable Leibniz algebras with naturally graded filiform nilradical" [Linear Algebra Appl. 438 (7) (2013) 2973–3000]

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ABSTRACT

There is a mistake in the description of complex solvable Leibniz algebras whose nilradical is a naturally graded filiform algebra [2, Theorem 4.3]. Namely, in the case where the dimension of the solvable Leibniz algebra with nilradical F_n^1 is equal to $n+2$, it was asserted that there is no such algebra. However, it was possible for us to find a unique $(n+2)$-dimensional solvable Leibniz algebra with nilradical F_n^1. The corrected description is provided in this Corrigendum note. In addition, we establish the triviality of the second group of cohomology for this algebra with coefficients in itself, which implies its rigidity.

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The purpose of this Corrigendum is to correct the mistake in [2, Theorem 4.3]. A complete new version of the paper and the proof of the rigidity of the algebra $R(F_n^1)$ is available at arXiv:1602.07200. Here we give only the correction of Theorem 4.3 and the statement of the rigidity of $R(F_n^1)$, using the notation of [2]. Now Theorem 4.3 reads as follows.

Theorem 1. *An arbitrary $(n+2)$-dimensional solvable Leibniz algebra with nilradical F_n^1 is isomorphic to the algebra $R(F_n^1)$ with the multiplication table:*

$$\begin{array}{lll} [e_i,e_1]=e_{i+1}, & 2\le i\le n-1, & [e_1,x]=e_1, \\ [e_i,y]=e_i, & 2\le i\le n, & [e_i,x]=(i-1)e_i, \quad 2\le i\le n, \\ & & [x,e_1]=-e_1. \end{array}$$

Proof. From the conditions of the theorem we have the existence of a basis $\{e_1,e_2,\dots,e_n, x,y\}$ such that the multiplication table of F_n^1 remains the same. The outer non-nilpotent derivations of F_n^1, denoted by D_x and D_y, are of the form given in [2, Proposition 4.1], with the set of entries $\{\alpha_i,\gamma\}$ and $\{\beta_i,\delta\}$, respectively, where $[e_i,x]=D_x(e_i)$ and $[e_i,y]=D_y(e_i)$.

By taking the following change of basis:

$$x'=\frac{\beta_2}{\alpha_1\beta_2-\alpha_2\beta_1}x-\frac{\alpha_2}{\alpha_1\beta_2-\alpha_2\beta_1}y, \qquad y'=-\frac{\beta_1}{\alpha_1\beta_2-\alpha_2\beta_1}x+\frac{\alpha_1}{\alpha_1\beta_2-\alpha_2\beta_1}y,$$

we may assume that $\alpha_1=\beta_2=1$ and $\alpha_2=\beta_1=0$.

Therefore, we have the products

$$\begin{array}{ll} [e_1,x]=e_1+\sum\limits_{i=3}^{n}\alpha_ie_i, & [e_2,x]=e_2+\sum\limits_{i=3}^{n-1}\alpha_ie_i+\gamma e_n, \\ [e_i,x]=(i-1)e_i+\sum\limits_{j=i+1}^{n}\alpha_{j-i+2}e_j, & 3\le i\le n, \\ [e_1,y]=e_2+\sum\limits_{i=3}^{n}\beta_ie_i, & [e_2,y]=e_2+\sum\limits_{i=3}^{n-1}\beta_ie_i+\delta e_n, \\ [e_i,y]=e_i+\sum\limits_{j=i+1}^{n}\beta_{j-i+2}e_j, & 3\le i\le n. \end{array}$$

Let us introduce the notations

$$[x,e_1]=\sum_{i=1}^{n}\lambda_ie_i, \qquad [x,e_2]=\sum_{i=1}^{n}\delta_ie_i, \qquad [x,x]=\sum_{i=1}^{n}\mu_ie_i.$$

From the Leibniz identity we get $[x,e_i]=0$, $3\le i\le n$.

By applying similar arguments as in Case 1 of the proof of [2, Theorem 4.2] and taking into account that the products $[e_i,y]$, $1\le i\le n$, will not be changed under the