Erratum: "A Special Class of Rank 10 and 11 Coxeter Groups" [J. Math. Phys. 48, 053512 (2007)]

Marc Henneaux,[1,2,a)] Mauricio Leston,[3,4,b)] Daniel Persson,[1,c)] and Philippe Spindel[5,d)]

[1]*Physique Théorique et Mathématique, Université Libre de Bruxelles and International Solvay Institutes, Boulevard du Triomphe, ULB-C.P. 231, B-1050 Bruxelles, Belgium*

[2]*Centro de Estudios Científicos (CECS), Casilla 1469, Valdivia, Chile*

[3]*Theoretische Naturkunde, Vrije Universiteit Brussel and International Solvay Institutes, Pleinlaan 2, B-1050 Brussels, Belgium*

[4]*Instituto de Astronomica y Fisica del Espacio (IAFE), Casilla de Correo 67, Sucursal 28, 1428 Buenos Aires, Argentina*

[5]*Service de Mécanique et Gravitation, Université de Mons-Hainaut, Académie Wallonie-Bruxelles, Avenue du Champ de Mars 6, 7000 Mons, Belgium*

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In the original article[1] we classified all rank 10 (respectively 11) Coxeter groups with incidence index $\mathcal{I}$ equal to 3 (respectively 4) and Coxeter exponents equal to 2 or 3. This problem is equivalent to the classification of all symmetric rank 10 (respectively 11) Cartan matrices with off-diagonal components equal to 0, except for three (respectively four) on each line equal to -1. The method we used was to first construct a redundant set of all such Cartan matrices, after which we extracted from this the subset of matrices differing by their set of eigenvalues (characteristic polynomial). In this way we obtained the 19 different rank 10 Coxeter groups, but only 252 of the 266 existing rank 11 Coxeter graphs with these properties.[2] The origin of this discrepancy is due to the inadequacy of the method adopted. Indeed, there exist distinct symmetric rank 11 Cartan matrices that have the same set of eigenvalues, but are not equivalent, in the sense that they cannot be related through conjugation by any permutation matrix.

Figure 1 provides an example of two such configurations, whose adjacency matrices give the same invariant polynomial, but nevertheless correspond to inequivalent Dynkin diagrams. Thus, given these considerations, the results presented in Ref. 1 have to be amended in the following way.

There exist 266 rank 11 Coxeter groups that split into the following subsets:

- *73 Cartan matrices of Lorentzian signature, 15 of which correspond to geometric configurations and so can be embedded into* $E_{11(11)}$. *Among them two pairs have the same eigenvalues, but are inequivalent.*
- *5 Cartan matrices with negative determinants, all of which have signature* $(3|_-, 8|_+)$.
- *11 Cartan matrices with vanishing determinants, all of which have one zero eigenvalue and one negative eigenvalue. Among them three inequivalent ones have the same set of eigenvalues, and seven can be derived from geometric configurations.*
- *1 Cartan matrix with vanishing determinant and with two negative and one zero eigenvalue.*
- *176 Cartan matrices with positive determinants but with signatures* $(2|_-, 9|_+)$. *In terms of their set of eigenvalues they split into 157 singlets, 8 pairs, and 1 triplet.*

a)Electronic mail: henneaux@ulb.ac.be.
b)Electronic mail: mauricio@iafe.uba.ar.
c)Electronic mail: dpersson@ulb.ac.be.
d)Electronic mail: Philippe.Spindel@umh.ac.be.

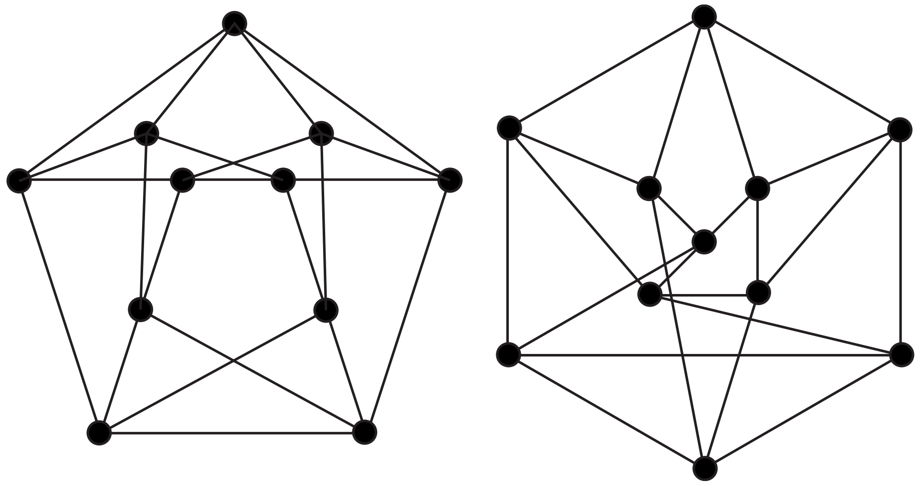

FIG. 1. An example of two rank 11 Coxeter graphs with incidence index $\mathcal{I}=4$. The left-hand graph admits a $\mathbb{Z}_2$ automorphism group, while the right-hand one does not admit any nontrivial automorphism. Both have the same characteristic polynomial: $-X^{11}+22X^{10}-198X^9+916X^8-2123X^7+1088X^6+6578X^5-17658X^4+19939X^3-10988X^2+2583X-170$.

All the 266 inequivalent Cartan matrices are assembled in the file "Coxeter11-4v4.nb" which is included in "Coxeterv4.zip" that can be downloaded from the database arXiv.org of Cornell University.[3]

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[1] M. Henneaux, M. Leston, D. Persson, and P. Spindel, "A Special Class of Rank 10 and 11 Coxeter Groups," J. Math. Phys. **48**, 053512 (2007); arXiv:hep-th/0610278.
[2] See http://www.mathe2.uni-bayreuth.de/markus/reggraphs.html for a complete list of the 19 rank 10 Coxeter graphs of incidence index 3, as well as the 266 rank 11 Coxeter graphs with incidence index 4. In this reference, these graphs are called regular graphs of degee 3 and 6, respectively.
[3] See http://arxiv.org/abs/hep-th/0610278 v4 where the file Coxeterv4.zip, containing a list of all inequivalent rank 10 and 11 Cartan matrices, may be downloaded.