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THE INDECOMPOSABLE PREPROJECTIVE AND PREINJECTIVE REPRESENTATIONS OF THE QUIVER $\widetilde{\mathbb{D}}_5$

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Abstract. Consider the quiver $\widetilde{\mathbb{D}}_5$ and its finite dimensional representations over the field k. We know due to Ringel in [7] that indecomposable representations without self extensions (called exceptional representations) can be exhibited using matrices involving as coefficients 0 and 1, such that the number of nonzero coefficients is precisely $d-1$, where d is the global dimension of the representation. This means that the corresponding "coefficient quiver" is a tree, so we will call such a presentation a "tree presentation". In this paper we describe explicit tree presentations for the indecomposable preprojective and preinjective representations of the quiver $\widetilde{\mathbb{D}}_5$. In this way we extend some results obtained by Mróz in [5] involving the $\widetilde{\mathbb{D}}_4$ case.

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REFERENCES

[1] Assem, I., Simson, D. and Skowroński, A., *Elements of the Representation Theory of Associative Algebras*, Vol. 1, "Techniques of Representation Theory", London Math. Soc. Student Texts, **65**, Cambridge Univ. Press, 2006.

[2] Auslander, M., Reiten, I. and Smalø, S., *Representation Theory of Artin Algebras*, Cambridge Studies in Advanced Math., **36**, Cambridge Univ. Press, 1995.

[3] Dlab, V. and Ringel, C. M., *Indecomposable representations of graphs and algebras*, Mem. Amer. Math. Soc., **173**, Providence, Rhode Island, 1976.

[4] Simson, D. and Skowroński, A., *Elements of Representation Theory of Associative Algebras, Vol.2, Tubes and Concealed Algebras of Euclidean type*, London Math. Soc. Student Texts 70, Cambridge Univ. Press, 2007.

[5] Mróz, A., *The dimensions of the homomorphism spaces to indecomposable modules over the four subspace algebra*, arXiv: 1207.2081.

[6] Mróz, A., *On the multiplicity problem and the isomorphism problem for the four subspace algebra*, Comm. Algebra, **40** (2012), 2005–2036.

[7] Ringel, C. M., *Exceptional modules are tree modules*, Lin. Algebra Appl., **275-276** (1998), 471–493.

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