

**Durand-Alegria, A. I.; Lopez-Sanchez, J.; Perez de Vargas, A.**

**Zygotic algebra for two-linked loci with sexually different recombination and mutation rates.**  
(English) [Zbl 0692.92013](#)  
*Linear Algebra Appl.* 121, 385-399 (1989).

The last two authors have written an earlier paper on zygotic algebras for two-linked loci with sexually different recombination rates [*Bull. Math. Biol.* 47, 771-782 (1985; [Zbl 0586.92016](#))]. In this paper the authors introduce mutations with the possibility that the mutation rates differ as well. Incidentally the earlier paper inspired a paper by the reviewer [*J. Math. Biol.* 25, 677-683 (1987; [Zbl 0658.92015](#))] which is not mentioned in the references. The results are similar to the ones in the earlier paper even though the algebras involved are more complicated because of the mutations.

The main result is that if  $A$  is the algebra then  $A^2$  is a genetic algebra but not necessarily a special train algebra. The author concludes with a discussion on idempotents.

Reviewer: [H.Gonshor](#)

**MSC:**

[92D10](#) Genetics and epigenetics  
[17D92](#) Genetic algebras

**Keywords:**

canonical basis; train roots; zygotic algebras; two-linked loci; sexually different recombination rates; mutation rates; genetic algebra; train algebra; idempotents

**Full Text:** [DOI](#)

**References:**

- [1] Etherington, I. M.H., Genetic algebras, *Proc. Roy. Soc. Edinburgh*, 59, 242-258, (1939) · [Zbl 66.1209.01](#)
- [2] Etherington, I. M.H., Special train algebras, *Quart. J. Math.*, 12, 1-8, (1941) · [Zbl 67.0093.04](#)
- [3] Gonshor, H., Special train algebras arising in genetics, *Proc. Edinburgh Math. Soc.*, 12, 41-53, (1960) · [Zbl 0249.17003](#)
- [4] Gonshor, H., Special train algebras arising in genetics II, *Proc. Edinburgh Math. Soc.*, 14, 333-338, (1965) · [Zbl 0139.03102](#)
- [5] Gonshor, H., Contributions to genetic algebras, *Proc. Edinburgh Math. Soc.*, 17, 289-298, (1971) · [Zbl 0247.92002](#)
- [6] Gonshor, H., Contributions to genetic algebras II, *Proc. Edinburgh Math. Soc.*, 18, 273-279, (1973) · [Zbl 0272.92012](#)
- [7] Heuch, I., The linear algebra for linked loci with mutation, *Math. Biosci.*, 16, 262-271, (1973) · [Zbl 0251.17001](#)
- [8] Heuch, I., Partial and complete sex linkage in infinite populations, *J. Math. Biol.*, 1, 331-343, (1975) · [Zbl 0301.92013](#)
- [9] Heuch, I., Genetic algebras for systems with linked loci, *Math. Biosci.*, 34, 35-47, (1977) · [Zbl 0361.92015](#)
- [10] Holgate, P., The genetic algebra of  $k$ -linked loci, *Proc. London Math. Soc.*, 18, 315-327, (1968) · [Zbl 0157.26703](#)
- [11] Holgate, P., Canonical multiplication in the genetic algebra for linked loci, *Linear Algebra Appl.*, 26, 281-286, (1979) · [Zbl 0408.92004](#)
- [12] Holgate, P., Population algebras, *J. Roy. Statist. Soc. Ser. B*, 43, 1-19, (1981) · [Zbl 0472.92008](#)
- [13] Lopez-Sanchez, J.; Perez de Vargas, A., Zygotic algebra for two-linked loci with sexually different recombination rates, *Bull. Math. Biol.*, 47, 771-782, (1985) · [Zbl 0586.92016](#)
- [14] Lopez-Sanchez, J.; Martinez-Calvo, C.; Perez, de Vargas A., Genetic algebra for two-linked loci with complete crossing-over, Las Palmas, *Proceeding of the Second World Conference on Mathematics*, 184-186, (1982) · [Zbl 0507.92013](#)
- [15] Reiersöl, O., Genetic algebras studied recursively and by means of differential operators, *Math. Scand.*, 10, 25-44, (1962) · [Zbl 0286.17006](#)
- [16] Schafer, R. D., Structure of genetic algebras, *Amer. J. Math.*, 71, 121-135, (1949) · [Zbl 0034.02004](#)
- [17] Wörz-Busekros, A., The zygotic algebra for sex linkage, *J. Math. Biol.*, 1, 37-46, (1974) · [Zbl 0407.92012](#)
- [18] Wörz-Busekros, A., The zygotic algebra for sex linkage II, *J. Math. Biol.*, 2, 359-371, (1975) · [Zbl 0327.92010](#)
- [19] Wörz-Busekros, A., *Algebras in genetics*, (1980), Springer-Verlag · [Zbl 0431.92017](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.