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NATURAL GROUP ACTIONS ON TENSOR PRODUCTS OF THREE REAL VECTOR SPACES WITH FINITELY MANY ORBITS*

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Abstract. Let G be the direct product of the general linear groups of three real vector spaces U, V, W of dimensions l, m, n $(2 \leq l \leq m \leq n < \infty)$. Consider the natural action of G on the tensor product of these spaces. The number of G-orbits in X is finite if and only if $l = 2$ and $m = 2$ or 3. In these cases the G-orbits and their connected components are classified, and the closure of each of the components is determined. The proofs make use of recent results of P.G. Parfenov, who solved the same problem for complex vector spaces.

Key words. Matrix pencils, Kronecker-Weierstrass theory, prehomogeneous vector spaces, relative invariants.

AMS subject classifications. 15A69, 15A72

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