

Direct products and homomorphisms

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It is well known that the direct products are characterized up to isomorphism by their universal properties: the canonical homomorphism $\text{Hom}(A, \prod_i A_i) \rightarrow \prod_i \text{Hom}(A, A_i)$, $\alpha \mapsto (\pi_i \alpha)_i$, where π_i are the canonical projections, is a bijection. We consider universal algebras (with 0) with the property that there are (natural) bijections $\text{Hom}(\prod_i A_i, A) \rightarrow \prod_i \text{Hom}(A_i, A)$. We prove that this is a very rare property. We will also discuss some related results.

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