On Serre's Problem on Projective Semimodules over Polynomial Semirings

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Abstract

Among other results of this paper, we single out the following ones. We show that division rings are the only division semirings over which the categories of semimodules are Schreier varieties, i.e., all subsemimodules of free semimodules are free too. We a complete description of division semirings R over which the categories of semimodules $\mathbb{M}$R are p-Schreier varieties, i.e., varieties whose all projective algebras are free. We give a complete description of proper division semirings R whose categories of semimodules $\mathbb{M}$R(X) over the polynomial semirings R(X) over R, in not necessary commuting variables X, are p-Schreier varieties. We show that the categories of semimodules $\mathbb{M}$R(X) over the polynomial semirings R(X) over N-valued semirings R, in particular $\mathbb{M}$N(X), are p-Schreier varieties. We also show that for N-valued semirings S, the semimodule categories $\mathbb{M}$S never are Schreier varieties. © 2014 Copyright Taylor & Francis Group, LLC.

Keywords