Cancellation Problem for Algebras
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Abstract: In his 1949 Paris Colloquium talk, Zariski raised the question: Suppose that $L_1(x) \cong kL_2(x)$, does it follow that $L_1 \cong kL_2$? Here, $L_1$ and $L_2$ are two finitely generated fields over a base field $k$; respectively, $L_1(x)$ and $L_2(x)$ are simple transcendental extensions of $L_1$ and $L_2$. Motivated by this question, several problems on the cancellation properties have been investigated from various perspectives. Among them features the Zariski Cancellation Problem which asks whether it is true that $V \cong A^n$ when $V$ is an affine variety with the property that $A^{n+1} \cong V \times A^1$. Ring theoretically, one studies the question whether $A[x_1, \ldots, x_n] \cong k[y_1, \ldots, y_n]$ implies $A \cong B$, where $SA$ and $SB$ are algebras over the base field $k$. There has been much success on the study of this problem and related ones despite the fact that the Zariski Cancellation Problem remains unsolved for $n \geq 3$ in the zero characteristic case. Recently, the cancellation problem for noncommutative algebras has been fruitfully studied using the method of discriminants. In this talk, we will give an overview of the rich literature and present some preliminary results.