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Title of Poster Presentation: Quantum Planes, Trains, and Automobiles

Abstract:
The quantum plane is a noncommutative ring generated by two variables x and y subject to the relation $yx=qxy$ where q is an arbitrary real number. In the classical commutative case, $q=1$. Elements of the quantum plane are called polynomials. A polynomical of the form $ax^2 + bxy + cy^2$ is called a quadratic form. Necessary and sufficient conditions for a quadratic form to be irreducible are provided. Every prime polynomial is irreducible, but the value of q plays a key role in determining if irreducible polynomials are prime. Detailed descriptions are given for the quadratic forms $x^2 + cy^2$ and $x^2 + bxy + y^2$. Graphs indicate values of q, b, and c where these quadratic forms are reducible (in red), irreducible (in yellow), or prime (in green).