Divided power envelopes and the geometry of p-curvature

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Abstract

If $X \to Y$ is a regular immersion of schemes in characteristic p, let $Y_X^\gamma \to Y$ be the divided power envelope of X in Y. The map $Y_X^\gamma \to Y$ factors through the Frobenius neighborhood Y_X^ϕ of X in Y, and in fact $Y_X^\gamma \to Y_X^\phi$ has a natural structure of a principal homogenous space under an action of a linear group scheme over Y_X^ϕ. If Y/S is smooth, an application of this result to the divided power envelope of the diagonal of $Y \times_S Y$ gives a geometric interpretation of p-curvature.