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Alexandru Buium* (buium@math.unm.edu), Department of Math and Stat, University of New Mexico, Albuquerque, NM 87131, and **Santiago Simanca**. *Arithmetic Partial Differential Equations*.

We develop an arithmetic analogue of linear partial differential equations in two independent “space-time” variables. The spatial derivative is a Fermat quotient operator, while the time derivative is a usual derivation. This allows us to “flow” integers or, more generally, points on algebraic groups with coordinates in rings with arithmetic flavor. In particular, we show that elliptic curves have certain canonical “arithmetic flows” on them that are arithmetic analogues of the convection, heat, and wave equations. The same is true for the additive and the multiplicative group. (Received January 12, 2007)