1056-17-120 **Nora C. Hopkins*** (Nora.Hopkins@indstate.edu), Dept. of Math. and Comp. Sci., Indiana State University, Terre Haute, IN 47809. *Periodicity of quadratic differential equations in nonassociative algebras and dimensions of subalgebras.*

Suppose A is a finite dimensional commutative non-associative algebra over the reals. It has long been known that $Z(t,P) \in A(P)$ for all t in the domain of $Z(t,P)$ where $Z(t,P)$ is the solution to the vector differential equation $\frac{dZ}{dt} = Z^2$ with $Z(0,P) = P$, and $A(P)$ is the sub-algebra of A generated by P. This is still true if all of the variables are complexified. For any algebra generated by Q in $A + iA$. Using Galois cohomology, I will show that if $P \in A, Q = Z(t_0, P)$ for some $t_0 \notin \mathbb{R}$, $\dim_{\mathbb{C}} Q = \dim_{\mathbb{C}} P$, the domain of $Z(t,P)$ is $\mathbb{C}$, and $Aut\, A(P)$ is a finite group, then $Z(t,P)$ is periodic with a non-real period. (Received July 28, 2009)