MR1661276 (99k:17051) 17D92
Mallol, Cristián (RCH-FRN-MS)
Dérivations de Peirce et structure d'algèbre. (French. French summary) [Peirce derivations and structure of an algebra]
Comm. Algebra **26** (1998), *no. 12,* 4149–4157.

Following ideas of some previous papers, the author considers here a commutative algebra A over a field K of characteristic zero and studies the influence that the existence of many derivations (with some additional conditions) has on the structure of the algebra. The algebras considered are assumed to have a nonzero idempotent element e such that $A = Ke \oplus U \oplus V$, where $U = \{x \in A|\ ex = \frac{1}{2}x\}$ and $V = \{x \in A|\ ex = \gamma x,\ \gamma \neq \frac{1}{2}\}$.

Elementary considerations on derivations lead to the definition of the set of Peirce derivations $\mathrm{DP} = \{\delta \in \mathrm{Der}(A)|\ \delta(U) \subset V,\ \delta(V) \subset U\}$.

In this paper it is proved that, under the assumption that DP is isomorphic to U (as vector space) via $\delta \to \delta(e)$ and $[\mathrm{DP}, \mathrm{DP}] = (0)$, the following consequences for the structure of A are obtained: (1) $U^2 \subset V,\ UV \subset U,\ V^2 \subset \mathrm{Ann}_U(U) \oplus V$, where $\mathrm{Ann}_U(U) = \{u \in U|\ uU = (0)\}$, (2) A is a baric algebra with weight homomorphism $\omega\colon A \to K,\ \omega(\lambda e + u + v) = \lambda,\ u \in U,\ v \in V$. (3) $U^2V = U(UV) = U^3 = (U^2)^2 = (UV)^2 = U^2V^2 = (0)$, (4) $A_e = Ke \oplus U \oplus U^2$ is a train algebra of rank 3 and train equation $x^3 - (1+\gamma)\omega(x)x^2 - \gamma\omega(x)^2x = 0$, (5) $A^2 = A_e$ if and only if A is a Bernstein algebra.

Consuelo Martínez