Neil Epstein* (nepstei2@gmu.edu). The Ohm-Rush content function and its applications.
For an $R$-algebra $S$, the (Ohm-Rush) content $c(f)$ of an element $f \in S$ is the intersection of all ideals $I$ such that $f \in IS$. If there is always a smallest such ideal (i.e. $f \in c(f)S$), we call $S$ an Ohm-Rush algebra. Further content-related properties carry their own names and implications. The theory examines algebraic properties of polynomial extensions $R \to R[x]$ and what can be generalized from them.

I will report on some results regarding the Ohm-Rush content function, along with applications to apparently disparate areas of commutative algebra. For instance,

- a new criterion for regularity in Noetherian reduced local rings of characteristic $p$.

- Given a regular field extension $L/K$, a Noetherian $K$-algebra $R$, and a zero-divisor $g \in S := L \otimes_K R$, some nonzero element of $R$ kills $g$.

- (w/Shapiro) With $R, S$ be as above, if $S$ is locally a UFD, so is $R$.

- (w/Shapiro) $R \to \hat{R}$ (R Noetherian local) is Ohm-Rush if and only if every ideal of $\hat{R}$ is extended from $R$.

- (w/Carchedi) for any ring map $R \to S$, an algebraic characterization of when the map of topological spaces $\text{Spec } S \to \text{Spec } R$ is open

(Received September 15, 2020)