Commutative Ring Theory Days 2010

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PRIME AND SEMIPRIME OPERATIONS OVER ONE-DIMENSIONAL DOMAINS

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Closure operations defined on a commutative ring R can be thought of of maps f_c from the set of ideals of a ring to itself satisfying the properties:
(a) $I \subseteq f_c(I)$ for all $I \subseteq R$.
(b) If $I \subseteq J$, then $f_c(I) \subseteq f_c(J)$.
(c) $f_c(f_c(I)) = f_c(I)$ for all $I \subseteq R$.
Semiprime operations are closure operations which also satisfy:
(d) $f_c(I)f_c(J) \subseteq f_c(IJ)$ for all $I, J \subseteq R$.
Prime operations are semiprime operations for which the following also holds:
(e) $f_c(bI) = bf_c(I)$ for all regular elements $b \in R$ and all ideals $I \subseteq R$.
We will classify all the semiprime and prime operations on certain one-dimensional domains and discuss the algebraic structure on the set of semiprime/prime operations over these rings. If we expand the set of ideals, to the fractional ideals over R, we will observe that some of these semiprime operations are no longer defined.

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