Ideals related to Laver and Miller trees

Michal Dečo

Institute of Mathematics P.J. Šafárik University Košice, Slovakia

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A set $X \subseteq {}^{\omega}\kappa$ is strongly *I*-dominating, iff

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$$\bullet \quad \text{either } t \subseteq s \text{ or } t \supseteq s,$$

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, then $\operatorname{br}_p(t) = \{ \alpha \in \kappa : t \land \langle \alpha \rangle \in p \} \in \mathcal{I}^+$.

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$$p \leq q \quad \text{iff} \quad p \subseteq q \text{ and } (\forall t \in p)(\mathrm{br}_q(t) \in \mathcal{I}^+ \to \mathrm{br}_p(t) \in \mathcal{I}^+).$$

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Observation

If $p \in \mathbb{M}_{\mathcal{I}}$, $q \in \mathbb{L}_{\mathcal{I}}$ and $p \leq q$,

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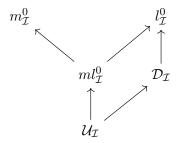
If $p \in \mathbb{M}_{\mathcal{I}}$, $q \in \mathbb{L}_{\mathcal{I}}$ and $p \leq q$, then $p \subseteq q$ and p is an \mathcal{I} -Laver tree with the same stem as q has.

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$$ml_{\mathcal{I}}^{0} = \{ X \subseteq {}^{\omega}\kappa : (\forall p \in \mathbb{M}_{\mathcal{I}}) (\exists q \in \mathbb{M}_{\mathcal{I}}) (q \le p \text{ and } [q] \cap X = \emptyset) \}.$$

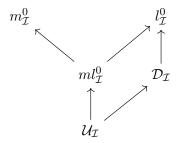
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Lemma

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For every tree $p \in \mathbb{M}_{\mathcal{I}}$ with $[p] \in \mathcal{D}_{\mathcal{I}}$ we have $[p] \in l^0_{\mathcal{I}} \setminus m^0_{\mathcal{I}}$,

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Lemma

(CH) If $\kappa < \mathfrak{c}$, then $m_{\mathcal{I}}^0 \not\subseteq l_{\mathcal{I}}^0$ and consequently $m l_{\mathcal{I}}^0 \subseteq m_{\mathcal{I}}^0 \cap l_{\mathcal{I}}^0 \subsetneq m_{\mathcal{I}}^0$.

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Question

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If the ideal \mathcal{I} is a prime ideal, is $\mathcal{U}_{\mathcal{I}} = m_{\mathcal{I}}^0$?

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If $2^{\kappa} = \mathfrak{c}$, the ideal \mathcal{I} is not prime and $\operatorname{non}(ml_{\mathcal{I}}^0) = \mathfrak{c}$, then there is a set $A \subseteq {}^{\omega}\kappa$ such that $A \in ml_{\mathcal{I}}^0$ and $A \notin \mathcal{D}_{\mathcal{I}}$. Hence $\mathcal{U}_{\mathcal{I}} \subsetneq ml_{\mathcal{I}}^0$ and $\mathcal{D}_{\mathcal{I}} \subsetneq l_{\mathcal{I}}^0$.

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An ideal ${\mathcal I}$ is *locally prime*, iff the set

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Theorem

• If $2^{\kappa} = \mathfrak{c}$ and the ideal \mathcal{I} is not locally prime, then $\mathcal{U}_{\mathcal{I}} \subsetneq ml_{\mathcal{I}}^{0}$ and $\mathcal{D}_{\mathcal{I}} \subsetneq l_{\mathcal{I}}^{0}$.

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- **2** (MA) If $\kappa < \mathfrak{c}$ and the ideal \mathcal{I} is not locally prime, then $\mathcal{U}_{\mathcal{I}} \subsetneq ml^0_{\mathcal{I}}$ and $\mathcal{D}_{\mathcal{I}} \subsetneq l^0_{\mathcal{I}}$.

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- (CH) If $\kappa < \mathfrak{c}$, then $\mathcal{D}_{\mathcal{I}} \subsetneq l^0_{\mathcal{I}}$ holds, if and only if the ideal \mathcal{I} is not prime.

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Thank you for your attention!

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