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Erratum

General Purpose Schedulers for Database Systems

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Definition 5.1 should read:

Definition 5.1. $(L, S) \in SE$ iff $L = \lambda \vee$

$$elem(L) \subset DOMAIN(S) \wedge (\exists i_1, \ldots, i_n \in [1, \infty))(L = R_{i_1} W_{i_1} \ldots R_{i_n} W_{i_n}).$$

Note that Definition 5.1 allows $i_k = i_l$, for some k, l. Hence, $(L, S) \in SE$ abstracts a serial computation of the transactions, possibly with repetitions. Moreover, note that weak serializability now has a slightly different interpretation.

With this change $\bar{\bar{H}}_{DBS}$ becomes unnecessary, so that Lemma 5.1 now reads.

Lemma 5.1. *Let $DBS = (V, A, n, S, SCD)$ be a database system and H_{DBS} be a Herbrand interpretation for DBS.*

$$\bar{y} \in \bar{H}_{DBS} \quad \textit{iff} \quad (\exists (L, S) \in SE)(p_{H_{DBS}}[L, S](\text{“}\bar{x}\text{”}) = \bar{y}). \quad \square$$

Theorem 5.2 remains the same, except that Step(5) is now unnecessary.

Proof of Lemma 5.1. ($\Leftarrow$) Follows from the definition of $\bar{H}$ and SE.

($\Rightarrow$) If $\bar{y}$ is a tuple of character strings, let $lg(\bar{y})$ denote the sum of the lengths of all coordinates of $\bar{y}$.

Note that $lg(\bar{y}) \geqq m$, if $\bar{y} \in \bar{H}_{DBS}$, where $m = \# V$. We prove the result by induction on $lg(\bar{y})$.

basis: assume that $lg(\bar{y}) = m$, $\bar{y} \in \bar{H}_{DBS}$.
Then $\bar{y} = \bar{x}$. Since $p_{H_{DBS}}[\lambda, S](\text{“}\bar{x}\text{”}) = \text{“}\bar{x}\text{”}$, we are done.

Induction step: assume that the result holds for $\bar{y} \in \bar{H}_{DBS}$ such that $lg(\bar{y}) < k$, $k > m$. Let $\bar{y}' \in \bar{H}_{DBS}$ be such that $lg(\bar{y}') = k$. Since $\bar{y}' \in \bar{H}_{DBS}$ and $k > m$, there must be $\bar{y} \in \bar{H}_{DBS}$ and $j \in [1, n]$ such that for any $i \in [1, m]$, if $x_i \notin S(W_j)$, then $y'_i = y_i$ otherwise $y'_i = \text{“}f_{yi}(y_{j_1}, \ldots, y_{j_{l_j}})\text{”}$, where $S(R_j) = \{x_{j_1}, \ldots, x_{j_{l_j}}\}$. Then, $lg(\bar{y}) < lg(\bar{y}')$. By the induction hypothesis, there is $(L, S) \in SE$ such that $p_{H_{DBS}}[L, S](\text{“}\bar{x}\text{”}) = \bar{y}$. Construct now $L' = L R_j W_j$. Then, we have that

$$p_{H_{DBS}}[L', S](\text{“}\bar{x}\text{”}) = p_{H_{DBS}}[R_j W_j, S](p_{H_{DBS}}[L, S](\text{“}\bar{x}\text{”})) = p_{H_{DBS}}[R_j W_j, S](\bar{y}) = \bar{y}'.$$

This concludes the proof. $\square$

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