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It is sufficient to show that for any $X \subseteq I$:
X is a transversal of $H(S) \iff X \notin cl(S)$.
According to this equivalence, Tr(H(S)) contains all minimal itemsets that are not in cl(S). Since cl(S) is the set of all frequent itesets that can be derived from S, the set of minimal itemsets not in cl(S) must be equal to the negative border. The proof of the above equivalence follows below.
"$\Rightarrow$":
Let X be a transversal of H(S). So we have $\forall B \in Bd^+(cl(S)) : X \cap (I - B) \neq \emptyset$. Lets do a proof by contradiction and assume $X \in cl(S)$. This means X is a frequent itemset that can be derived from a set B in $Bd^+(S)$ as a subset. So we obtain $X \subseteq B$ and $X \cap (I - B) \neq \emptyset$. But this is a contradiction because X cannot contain only elements from B while also containing elements from the complement from B at the same time.
"$\Leftarrow$":
Let $X \notin cl(S)$ be true. Lets again do a proof by contradiction and assume X is not a transversal of H(S). This means there has to be at least one $B \in Bd^+(cl(S))$ so that $X \cap (I - B) = \emptyset$. Since $X \subseteq I$, it follows that $X \subseteq B$. But this is obvously a contradiction to our first assumption $X \notin cl(S)$.