1067-05-1667 **Tianhui Cai*** (tcai@fas.harvard.edu), 174 Cabot Mail Center, 60 Linnaean Street, Cambridge, MA 02138. *Coin set extensions in the greedy change-making problem.*

Given a finite sequence $A = (1, a_1, \ldots, a_k)$ of positive integer coin denominations, we can make change for a positive integer amount x using the greedy algorithm, that is, by iteratively choosing the largest coin value $a_{i_1} \leq x$, then the largest coin $a_{i_2} \leq x - a_{i_1}$, and so on. Call a coin set *orderly* if, for every positive integer x, the greedy algorithm makes change for x with the fewest possible number of coins. Call a coin set B an *extension* of a coin set A if $B \supset A$ and all coins in $B - A$ are larger than the largest coin in A. Call a coin set an *obstruction* if it cannot be extended to an orderly coin set. We present a new characterization of orderly coin sets, and use this characterization to find simple conditions for when a one-coin extension is orderly. We also present a series of sufficient conditions to determine if a coin set is an obstruction, and we fully characterize all obstructions of length four. (Received September 21, 2010)