Continue, Stop, Restart Probability Model

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Abstract. We discuss a new class of applied probability models extending the model of optimal stopping of Markov chain. At each moment of a discrete time set a decision maker (DM) can apply one of three possible actions - continue, stop (quit), or restart at one of a finite number of fixed "restarting" points. The goal of the DM is to maximize the total discounted reward. We propose a transparent recursive algorithm to obtain an optimal strategy for the case of one restarting point and finite state space. The foundation for this algorithm is a modified version of the Elimination algorithm proposed earlier by one of the authors to solve the problem of optimal stopping of a Markov chain in discrete time and finite or countable state space. We discuss also a recursive procedure for the case of multiple restarting points and countable state space.

Keywords Markov chain; optimal stopping; restart; Elimination Algorithm