A new criteria of risk in Markov decision processes

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A new criteria

Optimal Equation

$$U(s) = R(s) + \max_a \sum_{s'} P(s'|s,a)U(s').$$

A new criteria

$$\rho_i(s,s') = \begin{cases} 1, & if\ U(s) > U(s') \\ 0.5, & if\ U(s) = U(s') \\ 0, & if\ U(s) < U(s') \end{cases}$$

Note that $i(1 \leq i \leq n-2)$ denotes the fire point. If $\frac{1}{n-2}\sum_1^{n-2}\rho_i(s,s') > 0.5$, then we say that state s is safer than s'.

Table 1 indicates the order of safety level and table 2 does the optimal evacuation root.

7	4	1	Exit
8	⬛	3	1
9	9	6	5

Table 1:(2,2) is blocked and (4,3) is exit.

→	→	→	Exit
↑	⬛	↑	↑
↑	→	↑	↑

Table 2:Optimal evacuation root.