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Golden optimal policy in calculus of variation and dynamic programming

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Abstract. This paper discusses four dynamic optimization problems on an infinite continuous time interval from a viewpoint of Golden optimality. The problem is whether an optimal policy is Golden or not. We solve two control processes with quadratic cost criterion and two allocation processes with discounted square-root reward criterion. Both processes have a linear dynamics. It is shown that one cotrol process does not admit a Golden optimal policy. The other three processes have a Golden optimal policy. Further we illustrate the Golden optimal trajectories through three approaches: (i) one-parametric method, (ii) Euler equation and (iii) Bellman equation.

Key words: golden policy, optimal policy, Euler equation, Bellman equation, golden optimality, control process, allocation process, golden section