

Optimizing Control of Chemical Plants under Uncertain Parameters: a Multiobjective Optimization Approach*

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Abstract. This paragraph shall summarize the contents of the paper in short terms. XXXXXXXXXXX XXXXXX CCCCC XXXXXXXX CCC XXXXX.

Keywords: optimal control, nonlinear system, dynamic programming.

1. Introduction

XXXXXXXXXX (Bellman, 1957) XXXXXX ... the explanation of the background work¹, the practical applications and the nature and purpose of the paper ... XXXXX CCCC (Tarantello, 1982a, b) XXXX CCC (Maschler and Peleg, 1976) XXXXXXX.

2. This is a First-Order Title

2.1. This is a Second-Order Title

Consider an optimal control problem (OCP) with dynamics ... XXXXXX CCCCC.

Definition 1. A Borelian function $H: [0, T] \times \mathbb{R}^{2n} \rightarrow \mathbb{R}$ is called (A_∞, B_∞) -subquadratic at infinity if there exists a function $N(t, x)$ such that ...

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This is a Third-Order Title. We shall first consider the question of nontriviality ... XXXXXX CCCCC XXXXXXXX CCC XXXXX CCCCC XXXXXX C XXXXX CCCCC XXXXXXXX.

Theorem 1 (Ghoussoub-Preiss). Assume $H(t, x)$ is $(0, \varepsilon)$ -subquadratic at infinity for all $\varepsilon > 0$, and T -periodic in t ...

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¹ See XXXXXXXX CCCCCCCCC

This is a Fourth-Order Title. We assume that H is (A_∞, B_∞) -subquadratic at infinity . . . ccccc xxxxxxxx ccccc xxx.

Lemma 1. Assume that H is C^2 on $\mathbb{R}^{2n} \setminus \{0\}$ and that $H''(x)$ is non-degenerate for any $x \neq 0$. Then any local minimizer \tilde{x} of ψ has minimal period T .

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Proposition 1. Assume $H'(0) = 0$ and $H(0) = 0$. Set:

$$\delta := \liminf_{x \rightarrow 0} 2N(x) \|x\|^{-2} . \tag{1}$$

If $\gamma < -\lambda < \delta$, the solution \bar{u} is non-zero:

$$\bar{x}(t) \neq 0 \quad \forall t . \tag{2}$$

Proof (of proposition). Condition (1) means that . . .

It is an exercise in convex analysis, into which we shall On the other hand, we check directly that □

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Corollary 1. Assume H is C^2 and (a_∞, b_∞) -subquadratic at infinity. Let . . .

Xxxxxx ccccc . . . Proposition 1 tells us that . . . xxxxxx cccc xxxxxxxx ccccc xxxx cccc xxxxxxx ccccc xxxxxx xxxxxxx.

2.2. This is a Second-Order Title again

The first results on subharmonics were . . . xxxxxx ccccc xxxxxx xxxxxxx ccccc xxxx cc xxxxxxxxxxxx cccc xxxxxxx.

Fig. 1. This is the caption of the figure displaying a white eagle and a white horse on a snow field.

Table 1. This is the example table.

Year	World population
8000 B.C.	5,000,000
50 A.D.	200,000,000
1650 A.D.	500,000,000
1945 A.D.	2,300,000,000
1980 A.D.	4,400,000,000

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Remark 1. The results in this section are a refined version of . . .

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Example 1 (External forcing). Consider the system:

$$\dot{x} = JH'(x) + f(t) \tag{3}$$

where the Hamiltonian H is . . . xxxxxx cccccc xxxxxxx ccc xxxxxxxxxxxxxxx.

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3. Conclusion

XXXXXXXXXXXX cccccccc xxxxxxx ccc xxxxxxxxxxxxxxx (Clarke et al., 1980) xxxx cc-
cccccc. XXXXXXXXXXX cccccc . . . by Subbotina (1986) . . . cccc xxxx ccc xxxxxxxxxxx.

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discussions on the subjects.

Appendix

1. First Appendix

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2. Second Appendix

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