ANALYSIS OF THE ERROR FOR HARMONIC TRACKING
USING AN ITERATIVE SCHEME IN GEOMETRIC CONTROL

EUGENIO AULISA, DAVID GILLIAM and THANUKA PATHIRANAGE

Department of Mathematics & Statistics, Texas Tech University, 79409 Lubbock, USA

Abstract. Geometric Control Theory was initiated in the beginning of the 1970’s and has now become a well established design methodology for problems of tracking prescribed reference signals while rejecting unwanted disturbance signals. In this paper we describe the error analysis for time-dependent harmonic signal tracking for general distributed parameter control systems with bounded input and output operators using an iterative numerical scheme based on the geometric design methodology.

MSC: 93C20, 65Y15
Keywords: Distributed parameter systems, dynamic regulator equations, geometric control, iterative numerical algorithm, regulator problem

CONTENTS

1. Introduction ................................................................. 144
2. Notation and Definitions .............................................. 144
3. Regularization of the DRE ............................................ 148
4. The Iterative Scheme .................................................. 150
5. Some Useful Formulas ................................................ 152
6. Analysis of the Error for an Initial Value Problem .............. 152
7. Estimates of the Error for Harmonic Tracking ................. 154
8. Numerical Example: Tracking Sinusoidal Signals .............. 159
9. Numerical Example: Tracking General Periodic Signals ...... 166
10. Acknowledgments ...................................................... 170
References ................................................................. 170