On a Conjecture of J.C. Butcher and H. Podhaisky

I. D. Coope*

February, 2006

Abstract

Given an $n \times n$ orthogonal matrix Q, there exists a diagonal matrix D with each diagonal entry chosen from $\{-1, 1\}$, such that $QD + I$ is non-singular and such that if

$$S = (QD - I)(QD + I)^{-1},$$

then the skew matrix S has every element in the interval $[-1, 1]$.

We prove that such a D exists and show that it can be computed efficiently and reliably.

*Dept. Mathematics & Statistics, University of Canterbury, Christchurch, New Zealand. mailto:ian.coope@canterbury.ac.nz