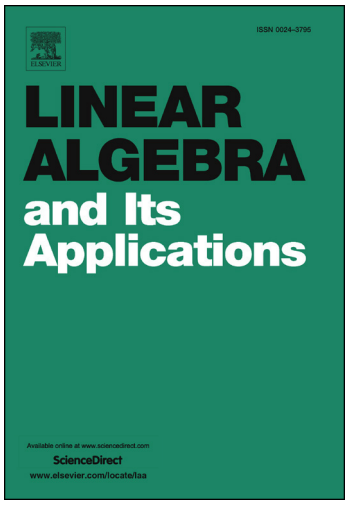
Accepted Manuscript



Solution of a class of nonlinear matrix equations

Snehasish Bose, Sk Monowar Hossein, Kallol Paul

PII: S0024-3795(17)30294-X
DOI: http://dx.doi.org/10.1016/j.laa.2017.05.006
Reference: LAA 14154

To appear in: *Linear Algebra and its Applications*

Received date: 26 July 2016
Accepted date: 2 May 2017

Please cite this article in press as: S. Bose et al., Solution of a class of nonlinear matrix equations, *Linear Algebra Appl.* (2017), http://dx.doi.org/10.1016/j.laa.2017.05.006

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Solution of a class of nonlinear matrix equations

Snehasish Bose[a], Sk Monowar Hossein[b], Kallol Paul[a,*]

[a] *Department of Mathematics, Jadavpur University, Jadavpur-32, West Bengal, India*
[b] *Department of Mathematics, Aliah University, Sector-V, Kolkata-91, West Bengal, India*

Abstract

In this paper we solve nonlinear matrix equations of the form

$$X^{\delta} = Q + \sum_{i=1}^{p} (A_i{}^* F_i(X) A_i)^{r_i}$$

and

$$X^{\delta} = Q + \sum_{i=1}^{p} (A_i{}^* F_i(X) A_i)^{r_i} + \sum_{j=1}^{q} (B_j{}^* G_j(X) B_j)^{q_j},$$

where $\delta \in (-\infty, -1] \cup [1, \infty)$, $r_i, q_j \in [-1, 1]$, $Q \in \mathcal{P}(n)$, the collection of all $n \times n$ Hermitian positive definite matrices and A_i, B_j's are $n \times n$ matrices, also F_i, G_j's are monotone mappings from $\mathcal{P}(n)$ into $\mathcal{P}(n)$. Examples are given to illustrate that the equations can not be solved by previously known theorems.

Keywords: Matrix Equation, Fixed point, Thompson metric.
2010 MSC: 15A24, 47H10, 47H09

1. Introduction and Preliminaries

Let $\mathcal{H}(n)$ be the set of all $n \times n$ Hermitian matrices and $\mathcal{P}(n)$ be the set of all $n \times n$ Hermitian positive definite matrices. We consider nonlinear matrix equations of the form

$$X^{\delta} = Q + \sum_{i=1}^{p} (A_i{}^* F_i(X) A_i)^{r_i} \tag{1.1}$$

and

$$X^{\delta} = Q + \sum_{i=1}^{p} (A_i{}^* F_i(X) A_i)^{r_i} + \sum_{j=1}^{q} (B_j{}^* G_j(X) B_j)^{q_j}, \tag{1.2}$$

*Corresponding author
Email addresses: bosesonay@gmail.com (Snehasish Bose), sami_milu@yahoo.co.uk (Sk Monowar Hossein), kalloldada@gmail.com (Kallol Paul)

Download English Version:

https://daneshyari.com/en/article/5772966

Download Persian Version:

https://daneshyari.com/article/5772966

Daneshyari.com