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Reviewed document: **18 Nonoscillation of a Class of Homogenous (Sai kumar 1) 27-5-2020.docx**
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A total of 50 sentences were analysed. As a result **23** sentences (46.0%) were found in other documents.

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Reference documents

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3 Sentences were found in a text with the title: „***27.pdf - 450-existence-of-nonoscillatory-solutions-of-second-order-neutral-differential-equations***", located at:
http://jaem.isikun.edu.tr/web/index.php/current/102-vol9no3/450-existence-of-nonoscillatory-solutions-of-second-order-neutral-differential-equations

2 Sentences were found in a text with the title: „***PII: S0898-1221(05)00186-0 - 82452031.pdf***", located at:
https://core.ac.uk/download/pdf/82452031.pdf

2 Sentences were found in a text with the title: „***FM42(2009)-RathRN-RathSK.pdf***", located at:
http://www.math.put.poznan.pl/artykuly/FM42(2009)-RathRN-RathSK.pdf

2 Sentences were found in a text with the title: „***Existence of nonoscillatory solutions of nonlinear neutral ...***", located at:
https://www.isr-publications.com/jmcs/articles-7648-existence-of-nonoscillatory-solutions-of-nonlinear-neutral-differential-equation-of-second-order

2 Sentences were found in a text with the title: „***Existence for Nonoscillatory Solutions of Higher-Order Nonlinear Differential Equations***", located at:
https://www.hindawi.com/journals/isrn/2011/485203/ref/
http://downloads.hindawi.com/journals/isrn/2011/485203.pdf

2 Sentences were found in a text with the title: „***SOME PROPERTIES ON THE GLOBAL BEHAVIOUR OF FIRST ...***", located at:
https://www.iaeme.com/MasterAdmin/uploadfolder/IJCIET_10_04_237/IJCIET_10_04_237.pdf

2 Sentences were found in a text with the title: „***Quantum spin systems on infinite lattices***", located at:
http://arxiv.org/abs/1311.2717

2 Sentences were found in a text with the title: „***Existence for Nonoscillatory Solutions of Higher-Order ...***", located at:
https://www.hindawi.com/journals/isrn/2011/485203/

2 Sentences were found in a text with the title: „***FM35-Rat.pdf***", located at:
http://www.math.put.poznan.pl/artykuly/FM35-Rat.pdf

2 Sentences were found in a text with the title: „***1901.09094***", located at:
http://arxiv.org/abs/1901.09094
http://arxiv.org/abs/var/lib/solr/arxiv-src/docs/1901.09094

2 Sentences were found in a text with the title: „***Existence of nonoscillatory solutions to second-order ...***", located at:
https://www.researchgate.net/publication/281459381_Existence_of_nonoscillatory_solutions_to_second-order_nonlinear_neutral_difference_equations
https://www.isr-publications.com/jnsa/articles-1659-existence-of-nonoscillatory-solutions-to-second-order-nonlinear-neutral-difference-equations

2 Sentences were found in a text with the title: „***10.1.1.439.2783.pdf - download***", located at:
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.439.2783&rep=rep1&type=pdf

2 Sentences were found in a text with the title: „***FM37_Rath-Padhy-Misra-wyd02.pdf***", located at:
http://www.math.put.poznan.pl/artykuly/FM37_Rath-Padhy-Misra-wyd02.pdf

2 Sentences were found in a text with the title: „***19.pdf - 442-existence-of-nonoscillatory-solutions-for-second-order-nonlinear-neutral-differential-equations-with-variable-delays***", located at:
http://jaem.isikun.edu.tr/web/index.php/archive/102-vol9no3/442-existence-of-nonoscillatory-solutions-for-second-order-nonlinear-neutral-differential-equations-with-variable-delays

▸ In 100 further documents exactly one sentence was found. (click to toggle view)

Subsequent the examined text extract:

Nonoscillation of a Class of Homogenous Neutral Delay

Differential Equations of Second Order

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Abstract

We present the conditions under which nonlinear neutral delay differential equation with positive and negative coefficients of the form

(1)

where, with > 0 for x0, i = 1, 2., possesses a nonoscillatory solution.

Key words: NonOscillation, Second Order, Neutral Differential equation

1. Introduction

In this paper we consider the neutral delay differential equation (NDDE) of second order,

(1)

where are positive numbers, ,

with> 0 for x0, i = 1, 2.

The study of delay differential equations and neutral delay differential equations is a subject for several investigators. We quote the works of [2, 3, 4, 5, 6, 13, 14]. In the absence of the function , and when $f_i(t) \equiv 0$, the above equation reduces to the second order delay differential equation,

(2)

and further, when the equation becomes

(3)

which is a nonlinear second order differential equation.

We can find a good amount of literature on the behavior of the solutions of equation (3). For some results on nonoscillation and asymptotic behaviour of solutions, we refer to [7, 8, 9, 11] and the references therein, while for the oscillatory behavior of solutions we refer to [1, 10,13].

The present work is motivated by [12] where the authors discussed the existence of periodic solutions with distributed deviating arguments. The purpose of our work is to obtain the conditions for the existence of nonoscillatory solutions of nonlinear neutral delay differential equations with positive and negative coefficients of the form

under the assumption that

We recall the following:

Let where = max be a given function and let be a given constant. By a solution of the equation (1) we mean a function in the sense that both and are continuously differentiable for; > 0, *y(t)* satisfies the equation (1) and

for

.

2. Main Results

We need the following hypotheses in our discussion:

Now we have the following:

Theorem 2.1

Let and is decreasing function. Assume that, are Lipschitzian on the intervals of the form [a, b], $0 < a < b < \infty$. and (H_1) –(hold. Then the equation (1) admits a nonoscillatory solution which is also bounded.

Proof: From the hypothesis, we observe that there exists such that

Also it is possible to choose a positive number such that

where= max; = max and,are Lipschitz constants of and respectively on.

Let X = BC be the Banach space of all bounded real valued continuous functions x on $[T_1, \infty)$ with supremum norm,

Define S = { x ε X : ≤ x(t) ≤ 1, t ≥ }

Clearly S is a complete metric space where the metric is induced by the norm on *X*.

For yS we define,

Using the hypotheses of the theorem we obtain

=

and

=

Hence, , thus ; i.e.

Also for *x, yS*

.

=

=

and hence T is a contraction.

Now by Banach fixed point theorem, T has unique fixed point. Thus $y(t)$ is a nonoscillatory solution of equation (1) which is bounded.

Theorem 2.2

Let and is increasing function. Assume that, are Lipschitzian on the intervals of the form [a, b], $0 < a < b < \infty$. and (H_1) –(hold. Then the equation (1) admits a nonoscillatory solution which is also bounded.

Proof: From the hypothesis, we observe that there exists such that

-1 << 0.

It is also possible to choose $T_1 > 0$ sufficiently large such that

<and

<

where= max; = max and,are Lipschitz constants of and respectively on

We choose the space X as in Case (i) with the same norm.

Define S = { x ε X : ≤ x(t) ≤ 1, t ≥ T_1 }

Clearly S is a complete metric space where the metric is induced by the norm on X.

For yS we define,

Clearly

and

Hence again ; i.e.

Also for

=

=

, and hence T is a contraction.

By contraction principle, T has unique fixed point. Thus $y(t)$ is a nonoscillatory solution of equation (1) which is bounded.

Theorem 2.3

Let . Assume that, are Lipschitzian on the intervals of the form [a, b], $0 < a < b < \infty$. and (H_1) –(hold. Then the equation (1) admits a nonoscillatory solution which is also bounded.

Proof: From hypothesis we suppose

such that b_3 < 0 and b_4 > 0 and < 1+5 As in earlier theorem, it is possible to choose a positive number > 0 such that

where , are as in Case (ii) on the interval of the form

Let 'X' be the space of bounded continuous functions on [ ) with supremum norm.

Define S=

For yS we define,

Clearly

and

Hence Thus

Hence again ; i.e.

Also for

=

=

But b_4< 1+5b_3

=

=

=

Thus , and hence T is a contraction.

By contraction principle, T has unique fixed point. Thus *y(t)* is a positive solution of equation (1) which is bounded.

Remark 2.4

The results of this paper can be conveniently extended for other ranges of

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