# REVIEW OF SELECTED PUBLICATIONS OF PROFESSOR J. O. C. EZEILO

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## 1. INTRODUCTION

Any attempt to classify the research works of Professor J.O.C. Ezeilo is a big job. Why? He had spent all his research life, (spanning over fifty-one years), in studying the qualitative properties of higher order nonlinear differential equation of orders 2,3,4,5,6, Nth order ( N odd and even) and systems in general. The qualitative properties studied covered many types of properties which include: Boundedness, Ultimate boundedness, Existence and Uniqueness results, Stability, Instability, periodicity, Oscillations, Resonance and Non-resonance, etc. While most of his life-long work was on the construction and use of Lyapunov functions, he spent the latter part of his life occasionally going into the use of topological degree methods and Leray Schauder techniques. These results initiated into higher order differential equations some well known results of the 2nd order, generalizing works of initiators in the subject, such as Cartwright (his Ph.D. supervisor), Barbashin, Loud, Erugin, Malkin, Krasovskii, Ogurcov, Reissig, Tejumola (his Ph.D. student), Pliss, Swick, Chow, Dunninger, among others.

The classifications of Professor Ezeilo's publications in line with the order and qualitative properties are set in section 2. We also list some of the publications of his, as we can easily can lay our hands on them in section 3.

His work among the Mathematical world is best appreciated by continuing to work further in his line of research. Most of his works were all recorded in the book [2] and the review carried out in [1], and in the American Mathematical Reviews as well as the Math. Zentralblat.

We shall miss you as An academic Grand-father and Academic God-father respectively. Rest in peace.

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## 2. CLASSIFICATION OF EZEILO'S RESEARCH PUBLICATIONS

| S/N | Order | Qualitative results |
|-----|-------|---------------------|
| 1 | 3rd | Boundedness result and extension of Cartwrights result on 2nd order |
| 2 | 3rd | Stability result via the construction of a suitable Lyapunov function |
| 3 | 3rd | Existence of periodic solutions via Leray Schauder technique |
| 4 | 3rd | Boundedness result and improvement of #1 and Pliss result |
| 5 | 4th | Boundedness and stability results by Lyapunov functions |
| 6 | 4th | Improvement of #5 in the direction of stability |
| 7 | 3rd | Property of phase space trajectories |
| 8 | 3rd | Global stability via Lyapunov function |
| 9 | 3rd | Boundedness |
| 10 | 3rd | Boundedness |
| 11 | 3rd | Boundedness |
| 12 | 3rd | Stability via Lyapunov second method (see reviewers comment) |
| 13 | 4th | Boundedness |
| 14 | 3rd | Boundedness and gives a simpler proof of #1 |
| 15 | 3rd | Systems Boundedness and asymptotic stability. Improves #7 |
| 16 | 3rd | Generalises, extends #2, #6 and Barbašin results |
| 17 | 3rd | Extension of #1 |
| 18 | 3rd | Continuation of #17 |
| 19 | 3rd | Improves #7 |
| 20 | 2nd | Existence of almost periodic solution (see reviewers comment) |
| 21 | Systems | Existence of almost periodic solution, generalization of Demidovic result |
| 22 | 3rd, 4th | Generalizes many known results (see reviewers comment) |
| 23 | Systems | Existence of uniform almost periodic solutions via Lyapunov function |
| 24 | 2nd | Generalization of a result of Loud |
| 25 | Systems | Nth dimensional analogues of some results of Loud |
| 26 | 3rd | Stability |
| 27 | Systems | Stability, generalizes earlier results of Erugin, Malkin and Krasovskii |
| 28 | Systems | Extends #1, #14, #16, #22 and some results of Barbašin and Pliss |
| 29 | Systems | Improvement of #15 |
| 30 | Systems | Erratum of #21 |

| S/N | Order | Qualitative results |
|---|---|---|
| 31 | 3rd | Corrigendum of #17 |
| 32 | 3rd | Boundedness and continuation of #14, #17 and #18 |
| 33 | Systems | Boundedness and stability |
| 34 | 3rd | Generalizes #2 and results of Ogurcov |
| 35 | 3rd | Boundedness and continuation of #17 and #31 |
| 36 | 3rd | Ultimate boundedness and extends some results of Reissig |
| 37 | Nth | Boundedness and generalises some results of Reissig |
| 38 | 4th | Boundedness via suitable Lyapunov function |
| 39 | 4th | Boundedness and generalizes #38 |
| 40 | 3rd | Generalized boundedness result |
| 41 | 4th | Boundedness |
| 42 | 3rd | Boundedness, generalises results of Reissig and Tejumola |
| 43 | 3rd | Some properties of a certain 3rd equation are given |
| 44 | 3rd | Existence of periodic solutions via Leray Schauder technique |
| 45 | 4th | Boundedness and stability |
| 46 | 5th | Boundedness and stability results |
| 47 | 2nd | Existence of periodic solution |
| 48 | 3rd | Existence of periodic solution |
| 49 | 2nd | Related to #47 |
| 50 | 3rd | Boundedness and relaxation of some conditions on Swicks earlier result |
| 51 | Nth | Existence of periodic solution |
| 52 | 3rd | Generalization of #50 |
| 53 | Systems | Extension of #32 |
| 54 | 5th | Improvement of #46 |
| 55 | 3rd | Extension of a result of Pliss |
| 56 | 3rd | Existence of periodic solution |
| 57 | 4th | Instability results via Lyapunov |
| 58 | 5th | Instability results via Lyapunov |
| 59 | 5th | Extension of #58 |
| 60 | 4th | Existence of periodic solution via Leray Schauder |
| 61 | 6th | Instability |
| 62 | 4th | Existence of periodic solution |
| 63 | 3rd | Existence of periodic solution |
| 64 | 4th | Nonresonance results |
| 65 | 3rd | Generalization of some Reissigs earlier result |
| 66 | 4th, 5th | Improvement of #57, #58 |
| 67 | Systems | Existence of periodic solution of certain 3rd order systems |
| 68 | Systems | Existence of periodic solution of certain 5rd order systems |
| 69 | 2nd | Periodic solution via a topological theorem of Gussefeldt |
| 70 | 6th | Existence of periodic solution |
| 71 | Pth | Generalization of #64 and results of Chow and Dunninger |
| 72 | Systems | Periodic solution of certain 4th and 5th order systems, generalises #28 |
| 73 | Odd | Existence of periodic solution via a topological theorem of Gussefeldt |
| 74 | 3rd | Existence of periodic solution |

| S/N | Order | Qualitative results |
| --- | --- | --- |
| 75 | 3rd | Survey paper |
| 76 | 3rd | Survey paper |
| 77 | 3rd | Resonance and non resonance results |
| 78 | 3rd | Non resonance results |
| 79 | 3rd | Periodic solution |
| 80 | 3rd | Non resonance |
| 81 | 3rd | Periodic solution |
| 82 | 3rd | Existence of periodic solutions |
| 83 | 4th | Existence of periodic solutions |
| 84 | 3rd | Applications in physics |
| 85 | 4th | Corrigendum of #72 |
| 86 | 3rd | Non resonance |
| 87 | 4th | Periodic boundary value problems |
| 88 | 4th | Instability results |
| 89 | 4th | Non resonance results |
| 90 | 3rd | Construction of Lyapunov functions |

## 3. SELECTED J. O. C. EZEILO'S RESEARCH PUBLICATIONS

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