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Associate Research Prof. Eng. Tamer Mekky Ahmed Ibrahim Habib

Personal Information

- **Nationality:** Egyptian.
- **Date of birth:** December 11th, 1978.
- **Military service:** Exempted.
- **Material status:** Married.



Education

- Cairo University.
- Faculty of engineering
- Aerospace department
- Graduation year – 2000
- Graduation grade – Very Good
- Master Degree of Science (Awarding year – 2003)
- Doctor of Philosophy (Awarding year – 2009).

Computer Skills:

A) Software:

- 1) Visual basic programming.
- 2) Matlab programming language.
- 3) Simulink.
- 4) Kiss data base.
- 5) STK (satellite tool kit).
- 6) Microsoft Word.
- 7) Microsoft Excel.
- 8) Microsoft PowerPoint.
- 9) Microsoft Access.
- 10) ActiveX Tec. (Using).
- 11) MDT (Mechanical Desktop).
- 12) GW Basic.
- 13) Quick Basic.
- 14) Fortran.
- 15) AutoCAD.
- 16) Pascal.
- 17) C ++.
- 18) HTML.
- 19) Assembly language.
- 20) Print artist.
- 21) Msc-Nastran (By N.A.S.A)
- 22) ICDL (International Computer Driving License) Certified.

B) Hardware:

- 1) Computer maintenance.
- 2) P.L.C.

- 3) Electronic circuit analysis.
- 4) Micro controller.
- 5) Digital circuit design and construction.
- 6) Arduino Uno

**Graduation
Project**

Topic: Spacecraft Attitude Determination and Control.
 Grade: Excellent.
 Tools: Matlab and Visual basic.
 Quick view: The project deals with satellite dynamics and attitude control using reaction wheels and magnetic rods. The design was done using the linearized dynamic equation and then applied to the non-linear actual system.
 Supervisor: Prof. Dr. Sayed Desouki.
 Prof. Dr. Gamal M. EL Bayoumi.

**MSc
Thesis**

Title: The Global Positioning System Application to Satellite Position and Attitude Determination.
 Tools: Matlab.
 Quick view: The thesis simulates the GPS constellation satellites in addition to a case study satellite that uses a GPS receiver for its position and attitude determination. This case study satellite is subject to various environmental effects. The resulting errors of position and attitude determination processes have been enhanced and then filtered. A new developed attitude determination algorithm has been presented, tested and compared with other algorithms. This algorithm has proven to be faster than some traditional algorithms in about seven times with the same accuracy. Finally, conclusions have been extracted from simulation results to evaluate the case study satellite and its GPS receiver performance.
 Super visors: Prof. Dr. Gamal M. EL Bayoumi.
 Dr. Ayman Hamdy Kassem.

**PhD
Thesis**

Title: New Algorithms of Nonlinear Spacecraft Attitude Control via Attitude, Angular Velocity, and Orbit Estimation Based on the Earth's Magnetic Field.
 Tools: Matlab.
 Quick view: The main objective of this thesis is to develop algorithms to bring the satellite from the detumbling mode to the attitude acquisition mode, and then to the stand-by mode based mainly on earth's magnetic field sensing and actuation. Nonlinear filters namely, the pseudo-linear Kalman filter, the extended Kalman filter, the unscented Kalman filter, the derivative free implementation of the extended Kalman filter, and the hybrid Kalman filter are

utilized. The main utilized attitude control algorithms were the high performance non-linear discrete magnetic controller, the sliding mode controller, and the nonlinear dynamic inversion controller. Optimum controller parameters are established throughout real coded genetic algorithms.

Super visors: Prof. Dr. Sayed Desouki Hassan.
Prof. Dr. Gamal M. EL Bayoumi.

List of Publications

1- T.M. Habib, A.H., Kassem, and G. M., El-Bayoumi, “GPS-Based Small Satellite Position and Attitude Determination Simulator”, Journal of Engineering and Applied Science, Vol. 52, No. 1, 2005, pp. 71-87.

2- T.M. Habib, S.D., Hassan, and G. M., El-Bayoumi, “Spacecraft Attitude and Attitude Rate Estimation Using Hybrid Kalman Filtering of Magnetometer Measurements”, Proceeding of the 12-th International Conference on Aerospace science and Aviation Technology, 2007.

3- T.M. Habib, “Fast Converging with High Accuracy Estimates of Satellite Attitude and Orbit Based on Magnetometer Augmented with Gyro, Star Sensor and GPS via Extended Kalman Filter”, The Egyptian Journal of Remote Sensing and Space Sciences, Vol.14, Issue 2, Dec. 2011, pp. 57-61.

4- T.M. Habib, “Global Optimum Spacecraft Orbit Control Subject to Bounded Thrust in Presence of Nonlinear and Random Disturbances in a Low Earth Orbit”, The Egyptian Journal of Remote Sensing and Space Sciences, Vol.15, Issue 1, June, 2012, pp. 1-8.

5- T.M. Habib, “Innovative Airborne and Aerospace Solutions for Defense and Remote-sensing”, The First International Conference on New Trends and Applications of GNSS, Cairo University, 2012.

6- T.M. Habib, “A Comparative Study of Spacecraft Attitude Determination and Estimation Algorithms(A cost-benefit approach)”, Aerospace Science and Technology, Vol.26, Issue 1, April-May, 2013, pp. 211-215.

7- T.M. Habib, “Simultaneous spacecraft orbit estimation and control based on GPS measurements via extended

Kalman filter”, The Egyptian Journal of Remote Sensing and Space Sciences, Vol.16, Issue 1, 2013, pp. 11-16.

8- T.M. Habib, “Concurrent Spacecraft Attitude and Orbit Estimation with Attitude Control Based on Magnetometer, Gyroscope, and GPS Measurements through Extended Kalman Filter”, Journal of Basic and Applied Sciences, Vol. 10, 2014, pp. 461-468.

9- T.M. Habib, “Artificial Satellites: History, Future, and Precautions”, Science, Vol.444, 2013, pp. 38-39.

10- T.M. Habib, “Combined Spacecraft Orbit and Attitude Control Through Extended Kalman Filtering of Magnetometer, Gyro, and GPS Measurements”, The Egyptian Journal of Remote Sensing and Space Sciences, Vol.17, Issue 1, Jan, 2014, pp. 87-94.

11- M., Awad, M., Mahmoud, T., Habib, , A., Mohamed, “Prediction of the orbital motion of an artificial satellite from radar measurements”, Al Azhar Bulletin of Science - Basic Science Sector, Vol.25, No. 1, June, 2014, pp. 15-20.

12- T.M. Habib, “A Review and a Quantitative Comparison among the Exact Solution and the Numerical Integration Methods with Fixed Time Step Commonly Used to Solve the Two-Body Problem”, Proceeding of the 7-th International Conference on Mathematics and Engineering Physics, May, 2014.

13- T.M. Habib, “Egypsat; An Integrated Road Map for Suggested Research Points – Astrodynamics Perspective”, ISNET/TUBITAK UZAY Workshop on Small Satellite Engineering and Design for OIC Countries, Oct, 2014.

14- T.M. Habib, “Necessary modifications to the strap-down inertial navigation system model for non-earth-based users”, International Journal of Aeronautical Science & Aerospace Research, 2015, 3, pp.1-11.

15- T.M. Habib, K.A., Kamalaldin, and A.H. Kassem “Commercial Cameras Accurate Focal Length Estimation for Satellite Optical Observation”, International Journal of Aeronautical Science & Aerospace Research, 2015, 2(4), pp.39-47.

16- A. H, Kassem, G. M. , El-bayoumi, T.M, Habib, and K.A., Kamalaldin, “Improving Satellite Orbit Estimation

using Commercial Cameras”, International Review of Aerospace Engineering, Vol.8, No. 5, Oct., 2015, pp. 174-178.

17- T.M. Habib, “A New Optimal Fusion Algorithm for Spacecraft Attitude Determination and Estimation Algorithms”, The Egyptian Journal of Remote Sensing and Space Sciences, Vol.21, 2018, pp. 305-309.

18- T.M, Habib, “In-Orbit Spacecraft Inertia, Attitude, and Orbit Estimation Based on Measurements of Magnetometer, Gyro, Star Sensor, and GPS Through Extended Kalman Filter”, International Review of Aerospace Engineering, Vol.11, No. 6, Dec., 2018, pp. 247-251.

19- T.M, Habib, “Spacecraft Nonlinear Attitude Dynamics Control with Adaptive Neuro-Fuzzy Inference System”, International Review of Automatic Control, Vol.12, No. 5, Dec., 2019, pp. 242-250.

Personal Skills

- 1) Oriented Research.
- 2) Teaching.
- 3) Helping others.
- 4) Hard working.
- 5) Managing teamwork.

Work Experience

- 1) As a teacher of (introduction to computers, DOS & Windows) courses.
- 2) As a teacher assistant for Visual basic courses.
- 3) As a software developer at Cairo University, Faculty of Engineering.
- 4) Responsible for Hardware/Software maintenance in the computer club at faculty of engineering.
- 5) As an engineer having the Basic course of aircraft maintenance without type rating at **EGYPT AIR (EGYPT AIR certified course)**.
- 6) Basic course of flight regulations.
- 7) Assistant at the **CIVIL AVIATION ACADEMY**.
- 8) Construction engineer (free work).
- 9) HVAC engineer at **ORASCOM** engineering company.
- 10) Research assistant at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**.
- 11) Assistant researcher at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**.

- 12) Attitude determination and control **Senior** engineer at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**.
- 13) Attitude determination and control **Group Leader** at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**.
- 14) Lecturer at Jazan university, Faculty of engineering, mechanical engineering department, Kingdom of Saudi Arabia.
- 15) Supervisor of Space environment, structure & thermal control department (as a department head) at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**, Space Division.
- 16) Assistant Professor of Automatic Control at the Higher Technological Institute, 10th of Ramadan City, Department of Mechanical Engineering.
- 17) Member of the post graduate studies steering committee at the National Authority for Remote Sensing and Space Sciences.
- 18) Member of research projects steering committee at the National Authority for Remote Sensing and Space Sciences.
- 19) Spacecraft dynamics and control department acting head at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**, Space Division.

Current Positions

- 1) Associate Professor (Associate Research Professor) at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**, Space Division, Spacecraft Dynamics and Control Department.
- 2) Spacecraft orbit department head at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**, Egyptian Space Program.
- 3) Technical office member at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**.
- 4) Space division acting head (as an acting dean) at **THE NATIONAL AUTHORITY FOR REMOTE SENSING AND SPACE SCIENCES**.

Languages

Language	Degree		
	Reading	Writing	Speaking
Arabic	Fluent	Fluent	Fluent
English	Fluent	Very good	Very good
French	Fair	Fair	Fair
Chinese	Very Poor	Very Poor	Very Poor
Urdu	Very Poor	Very Poor	Very Poor
Turkish	Very Poor	Very Poor	Very Poor

TOEFL Score : 610 (Local TOEFL).

Certificates

- 1- BSc, MSc, and PhD in aerospace engineering.
- 2- Computer software and hardware maintenance.
- 3- Introduction to computer, DOS, and windows trainee certificate.
- 4- Introduction to computer, DOS, and windows trainer certificate.
- 5- Microsoft excel.
- 6- Visual Basic.
- 7- International computer driving license (ICDL).
- 8- Aircraft maintenance basics for aeronautical engineering undergraduates.
- 9- Certified internal auditor for ISO 9001-2008.
- 10- Success completion of the international training workshop on numerical control technology, ministry of science and technology, The People's Republic of China.

Reviewer at the following journals and firms

- 1- Aerospace Science and Technology (ELSEVIER listed) (SCOPUS).
- 2- The Egyptian Journal of Remote Sensing and Space Sciences (ELSEVIER listed) (SCOPUS).
- 3- International Journal of Aerospace Engineering.
- 4- International Journal of Engineering and Technology Innovation.
- 5- Hindawi Publishing Co.
- 6- IET Sonar, Radar, and Navigation.
- 7- Science and Technology Development Fund (STDF). Reviewer Number 15726.

Editor at the following journals

- 1- International Journal of Aeronautical Science & Aerospace Research.
- 2- Journal of Physics & Astronomy.

Supervision of postgraduate students

- 1- A.H. Mohammed, “Future Prediction of the orbital Motion of an Artificial Satellite”, MSc Thesis, Astronomy, Space Science, and Meteorological Department, Faculty of Science, Cairo University, 2015.
- 2- A. B. Yassen, “Orbit Determination Modeling using GPS coupled with Earth Geopotential and Ocean Tides”, MSc Thesis, Astronomy, Space Science, and Meteorological Department, Faculty of Science, Cairo University, 2016.
- 3- K.A. Abdelrazik, “Spacecraft Orbit Estimation Via Optical Observation”, MSc Thesis, Aerospace Department, Faculty of Engineering, Cairo University, 2016.
- 4- A. M. Ismail, “ An Implementation and Verification of A High-Precision Orbit Propagator”, MSc Thesis, Aerospace Department, Faculty of Engineering, Cairo University, 2018.

Projects

Project Title	Project Fund Type	Role	Status
BOSAT Software Reverse Engineering	Internal	Principial Invistigator	Completed
Spacecraft Orbit Design Software Development	Internal	Principial Invistigator	Completed
Solar Powered Integrated System for Remote Sensing Applications (Phase I)	Internal	Co-Principial Invistigator	Delivered
Solar Powered Integrated System for Remote Sensing Applications (Phase II)	Funded from the Inter-Islamic Network on Space Sciences and Technology	Principial Invistigator	Initially Submitted

Personality

- I believe in ALLAH, and I wish to serve my country and my nation and defend them against intruders, even if it may cost me my life.
- I enjoy learning.
- I am controllable, dynamic, and self-motivated.
- I've the ability of following up, and the necessary amount of insistance to reach my goals.
- I'm very anxious to explore new fields specially but not necessarily fields, which are complementary to those I have already gained knowledge about.
- I enjoy the well-managed teamwork.
- I enjoy helping others.
- An aerospace engineer is a multi-field engineer (i.e. he can work as an aerospace engineer, mechanical engineer, steel structures designer civil engineer, electrical engineer.... etc).