DEVELOPMENT OF AN ADAPTIVE NEURO-CONTROLLER AND SATELLITE SIMULATOR FOR NANO-SATELLITE ATTITUDE CONTROL SYSTEM

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Muhammad Isa

Muhammad Aliff

Muhammad Muaz

Muhammad Aqil

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To all my family members

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LIST OF ABBREVIATIONS

ACS	Attitude Control System
ADC	Analog to Digital converter
ADS	Attitude Determination System
ADCS	Attitude Determination and Control System
AOCS	Attitude and Orbit Control System
ANC	Adaptive Neuro-Controller
ANGKASA	National Aerospace Agency
ANN	Artificial Neural Network
APBB	Adaptive Parametric Black Box
ATSB	Astronautic Technology (M) Sdn. Bhd.
ATOF	ASCII to floating point
ARLS	Adaptive Recursive Least Square
C&DH	Command and Data Handling
CMOS	Complementary metal–oxide–semiconductor
COMM	Communication System
CFB	Circulated Fluidized-Bed
CPU	Central Processor Unit
DARPA's	Defense Advanced Research Projects Agency's
EduSAT	Educational Satellite
EDAC	Error Detection and Correction Circuit
EEPROM	Electrical Erasable Programming Read Only Memoary
EMI	Electromagnetic Interference

EPOS	European Proximity Operations Simulator
ESMO	European Student Moon Orbiter
ESA	European Space Agency
FF	Forgetting Factor
FLC	Fuzzy Logic Control
FFNN	Feed-Forward Neural Network
FBFR	Fluidized Bed Furnace Reactor
GAPSO	Genetic Algorithm Particle Swarm Optimization
GPS	Global Positioning System
GG	Gravity Gradient
GSEG	Ground Station/Segment
GIT	Georgia Institute of Technology
GPC	Generalized Predictive Control
HILS	Hardware-in-loop-simulation
HMLP	Hybrid Multi Layered Perceptron
HEO	High Earth Orbit
HS	Hardware Simulator
I^2C	Inter-integrated Circuit
IPSO	Improved Particle Swarm Optimization
InnoSAT	Innovative Satellite
LS	Least Square
LEO	Low Earth Orbit
LTI	Linear Time-Invariant
MCU	Microcontroller Unit

MEO	Medium Earth Orbit
MRP	Modified Rodrigues Parameter
MLP	Multi Layered Perceptron
MRAC	Model Reference Adaptive Control
MPID	Modified Proportional, Integral, Derivative
MPC	Model Predictive Control
MIMO	Multiple Input Multiple Output
MIT	Massachusetts Institute of Technology
MSE	Mean Square Error
MBP	Momentum Back-Propagation
NN	Neural Network
NNC	Neural Network Controller
NSO	North Sea Observer
NNSAC	Neural Network Simple Adaptive Control
NAMPC	Nonlinear Adaptive Model Predictive Control
NNMPC	Neural Network Model Predictive Control
NARMAX	Non-linear Auto-Regressive Moving Average with exogenous input
OBC	On-Board Computer
PC	Personal Computer
PSO	Particle Swarm Optimization
PD	Proportional Derivative
PID	Proportional, Integral, Derivative
P-POD	Poly-Pico Satellite Orbital Deployer
PMC	Passive Magnetic Control