

**Robust nonlinear attitude control of aerospace vehicles  
An incremental nonlinear control approach**

Acquatella Bustillo, P.J.

**DOI**

[10.4233/uuid:99d82992-080c-4c5d-8d40-4e62e62285c0](https://doi.org/10.4233/uuid:99d82992-080c-4c5d-8d40-4e62e62285c0)

**Publication date**

2020

**Document Version**

Final published version

**Citation (APA)**

Acquatella Bustillo, P. J. (2020). *Robust nonlinear attitude control of aerospace vehicles: An incremental nonlinear control approach*. [Dissertation (TU Delft), Delft University of Technology].  
<https://doi.org/10.4233/uuid:99d82992-080c-4c5d-8d40-4e62e62285c0>

**Important note**

To cite this publication, please use the final published version (if applicable).  
Please check the document version above.

**Copyright**

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

**Takedown policy**

Please contact us and provide details if you believe this document breaches copyrights.  
We will remove access to the work immediately and investigate your claim.

1. The equation-based and acausal modeling features of MODELICA are useful to support preliminary studies in launch vehicle design. (*this thesis*)
2. For a class of input-affine nonlinear systems, incremental nonlinear dynamic inversion (INDI) is equivalent to a nonlinear PID control derived from model-based time delay control (TDC). (*this thesis*)
3. Control effectiveness uncertainty can be rejected by INDI, TDC, and linear PID control. INDI has better robustness than TDC and linear PID control because of the proper model-based scheduling of this term. (*this thesis*)
4. Incremental nonlinear control is both model- and sensor-based. (*this thesis*)
5. Roboticians and aerospace engineers should collaborate and work more together. Each field can greatly benefit from findings and methods of the other.
6. Courses on '*how to interact effectively with your research partners*' or '*how to solve conflicts efficiently*' should be pursued by all involved parties.
7. "*Feynman's Algorithm*" (1: Write down the problem. 2: Think real hard. 3: Write down the solution) should have included "1b: Understand the problem". Feynman did not include this because he was a genius.
8. Risk-free investments (government backed treasury bonds, savings accounts, etc.) are not risk-free, and certainly not investments.
9. When honesty comes above politeness, it should not be implied to be impolite in order to be honest, or by being polite one is being dishonest.
10. When the ups and downs of a doctoral research resembles the ones in financial markets, a good strategy is to invest in the long term.

These propositions are considered opposable and defensible and as such have been approved by the promotor prof.dr.ir. Max Mulder.