Nonlinear Automatic Gain Control Analysis

Cécile Pernin*[1], Scorletti Gérard[1], and Anton Korniienko[1]

[1]Ecole Centrale de Lyon, INSA Lyon, Université Claude Bernard Lyon 1, CNRS, Ampère, UMR5005 – Université de Lyon, Université Lyon 1 – France

Résumé

The work presented is under review for IFAC 4th MICNON 2024. The work focuses on the analysis of the nonlinear automatic gain control (AGC) used in order to make a mass oscillate at its natural frequency with a specified amplitude. This control is widely spread in Micro Electro Mechanical Sensor gyroscopes. However, ensuring the stability of the oscillation remains challenging. We investigate the stability of two variants of the AGC: an ideal and an implementable one, using appropriate change of variables and transverse contraction criterion from orbital stability theory. The results are validated through a numerical example obtained from a real gyroscope system.

*Intervenant