

1096-VL-789

A D Clark* (adclark@mail.com), **K Chang**, **R S Gejji**, **S Chrihalmeanu** and **A A Ross**.
Methodological Insights to Exploring the Stability of General and Photorealistic Models of the Pupil Light Reflex (PLR). Preliminary report.

We explore the stability of two main mathematical frameworks of the pupil light reflex (PLR) via the Lambert \mathcal{W} function. As a result, we can obtain a more comprehensive stability regime in terms of the delay and gain of the negative feedback system. We also apply this approach to explore the stability of extended models of the PLR where we incorporate the iris musculature effects. This work is not only an improvement on the related research on this topic, but has several applications in the fields of mathematical biology, computer graphics, and biometrics. In biometrics, particularly in the area of iris recognition, our work will aide the National Institute of Standards and Technology's (NIST's) efforts for understanding the effects of dilation on iris recognition. Additionally, our work will serve the Department of Homeland Security (DHS) in providing avenues of mitigating the effects of iris dilation on matching performance for border control scenarios. (Received September 10, 2013)