EXPERIMENTS ON THE PFLUGER COLUMN: FLUTTER FROM FRICTION

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Keyword: Beck column, Dry friction

ABSTRACT

Experiments on flutter instability on structures were pioneered by Wood, Saw and Saunders [1] and developed by Prof. Sugiyama and his co-workers [2, 3], see the review paper by Elisakoff [4].

Bigoni and Noselli [5] have presented the first experimental evidence that Coulomb friction can induce flutter and divergence instability. In particular, they have shown how a follower force can be realized by employing dry friction. This force was applied to the Ziegler double pendulum, so that experiments demonstrated at increasing load: stability, flutter, and finally divergence.

Their experimental setting was limited to the Ziegler double pendulum, so that they were unable to induce flutter in more complex structures such as the Beck and the Pfluger columns. Therefore, the experimental apparatus developed by Bigoni and Noselli has been completely redesigned, so that a completely new experimental apparatus has been developed. This apparatus allows to induce follower forces via Coulomb friction on model structures. Using the new experimental setup, the Pfluger column has been investigated confirming flutter and divergence instability and showing the unstabilizing effect of dissipation.

References

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