

Accepted Manuscript

Dynamics of vibro-impact drilling with linear and nonlinear rock models

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PII: S0020-7403(18)32048-4
DOI: <https://doi.org/10.1016/j.ijmecsci.2018.07.039>
Reference: MS 4451



To appear in: *International Journal of Mechanical Sciences*

Received date: 28 June 2018

Accepted date: 28 July 2018

Please cite this article as: Maolin Liao, Yang Liu, Joseph Páez Chávez, Antonio S.E. Chong, Marian Wiercigroch, Dynamics of vibro-impact drilling with linear and nonlinear rock models, *International Journal of Mechanical Sciences* (2018), doi: <https://doi.org/10.1016/j.ijmecsci.2018.07.039>

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Highlights

- The dynamic responses of a bit-rock system with both the linear and non-linear interaction models are verified as similar. Hence, the linear model is suggested to predict the system dynamics due to its higher computing efficiency.
- An isola of period-doubling bifurcations is observed during two-parameter continuation, and the isola is formed via two turning points which lie on its left and right endpoints.
- As the increase of either excitation amplitude or static force, the ROP of the stable period-one motion can be promoted almost linearly. While, the increase of excitation frequency will lead to a nonlinear decrease of the ROP.

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