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Response of beams on nonlinear viscoelastic foundations to harmonic moving loads

Kargarnovin, M.H.^a , Younesian, D.^b, Thompson, D.J.^c, Jones, C.J.C.^c ^a Center of Excellence in Design, Robotics and Automation, Mechanical Engineering Department-Sharif, University of Technology, Tehran 11365-9567, Iran^b Mechanical Engineering Department-Sharif, University of Technology, Tehran 11365-9567, Iran^c Institute of Sound and Vibration Research (ISVR), University of Southampton, Southampton, S017 1BJ, United Kingdom**Abstract**

The response of infinite beams supported by nonlinear viscoelastic foundations subjected to harmonic moving loads is studied. A straightforward solution technique applicable in the frequency domain is presented in this paper. The governing equations are solved using a perturbation method in conjunction with complex Fourier transformation. A closed-form solution is presented in an integral form based on the presented Green's function and the theorem of residues is used for the calculation of integrals. The solution is directed to compute the deflection and bending moment distribution along the length of the beam. A parametric study is carried out and influences of the load speed and frequency on the beam responses are investigated. It is found that for an excitation frequency of Ω there exist superharmonics of $3\Omega O(\epsilon)$, $5\Omega O(\epsilon^2)$, ..., $(2n - 1) \times \Omega O(\epsilon^{n-1})$, $n = 1, 2, \dots$ © 2005 Elsevier Ltd. All rights reserved.

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- Fryba, L. (1999) *Vibration of Solids and Structures under Moving Loads*. Cited 239 times. Thomas Telford London
- Metrikine, A.V., Popp, K. **Vibration of a periodically supported beam on an elastic half-space** (1999) *European Journal of Mechanics, A/Solids*, 18 (4), pp. 679-701. Cited 33 times. doi: 10.1016/S0997-7538(99)00141-2
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- Vostroukhov, A.V., Metrikine, A.V. **Periodically supported beam on a visco-elastic layer as a model for dynamic analysis of a high-speed railway track** (2003) *International Journal of Solids and Structures*, 40 (21), pp. 5723-5752. Cited 41 times. doi: 10.1016/S0020-7683(03)00311-1
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- Sheng, X., Jones, C.J.C., Petyt, M. **Ground vibration generated by a harmonic load acting on a railway track** (1999) *Journal of Sound and Vibration*, 225 (1), pp. 3-28. Cited 70 times.

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Simulations of ground vibration from a moving harmonic load on a railway track
 (2000) *Journal of Sound and Vibration*, 231 (3), pp. 739-751. Cited 24 times.
 doi: 10.1006/jsvi.1999.2559

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- 6  Andersen, L., Nielsen, S.R.K., Kirkegaard, P.H.
Finite element modelling of infinite Euler beams on Kelvin foundations exposed to moving loads in convected co-ordinates
 (2001) *Journal of Sound and Vibration*, 241 (4), pp. 587-604. Cited 21 times.
 doi: 10.1006/jsvi.2000.3314


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- 7  Sun, L.
Dynamic displacement response of beam-type structures to moving line loads
 (2001) *International Journal of Solids and Structures*, 38 (48-49), pp. 8869-8878. Cited 18 times.
 doi: 10.1016/S0020-7683(01)00044-0

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- 8  Sun, L.
A closed-form solution of beam on viscoelastic subgrade subjected to moving loads
 (2002) *Computers and Structures*, 80 (1), pp. 1-8. Cited 12 times.
 doi: 10.1016/S0045-7949(01)00162-6

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- 9  Chen, Y.-H., Huang, Y.-H., Shih, C.-T.
Response of an infinite tomoshenko beam on a viscoelastic foundation to a harmonic moving load
 (2001) *Journal of Sound and Vibration*, 241 (5), pp. 809-824. Cited 19 times.
 doi: 10.1006/jsvi.2000.3333

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- 10  Kargarnovin, M.H., Younesian, D.
Dynamic response analysis of Timoshenko beam on viscoelastic foundation under an arbitrary distributed harmonic moving load
 (2002) *Proc of Fifth Int Conf on Structural Dynamics*. Cited 2 times.
 Munich

- 11  Kargarnovin, M.H., Younesian, D.
Dynamics of Timoshenko beams on Pasternak foundation under moving load
 (2004) *Mechanics Research Communications*, 31 (6), pp. 713-723. Cited 41 times.
 doi: 10.1016/j.mechrescom.2004.05.002


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- 12  Kim, S.-M.
Vibration and stability of axial loaded beams on elastic foundation under moving harmonic loads
 (2004) *Engineering Structures*, 26 (1), pp. 95-105. Cited 17 times.
 doi: 10.1016/j.engstruct.2003.09.001

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- 13  Sheng, X., Jones, C.J.C., Thompson, D.J.
A theoretical study on the influence of the track on train-induced ground vibration
 (2004) *Journal of Sound and Vibration*, 272 (3-5), pp. 909-936. Cited 21 times.

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- 14  Dahlberg, T.
Dynamic interaction between train and nonlinear railway model
 (2002) *Proc of Fifth Int Conf on Structural Dynamics*. Cited 2 times.
 Munich

- 15  Wu, T.X., Thompson, D.J.
The effects of track non-linearity on wheel/rail impact
 (2004) *Proceedings of the Institution of Mechanical Engineers, Part F: Journal of Rail and Rapid Transit*, 218 (1), pp. 1-16.

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