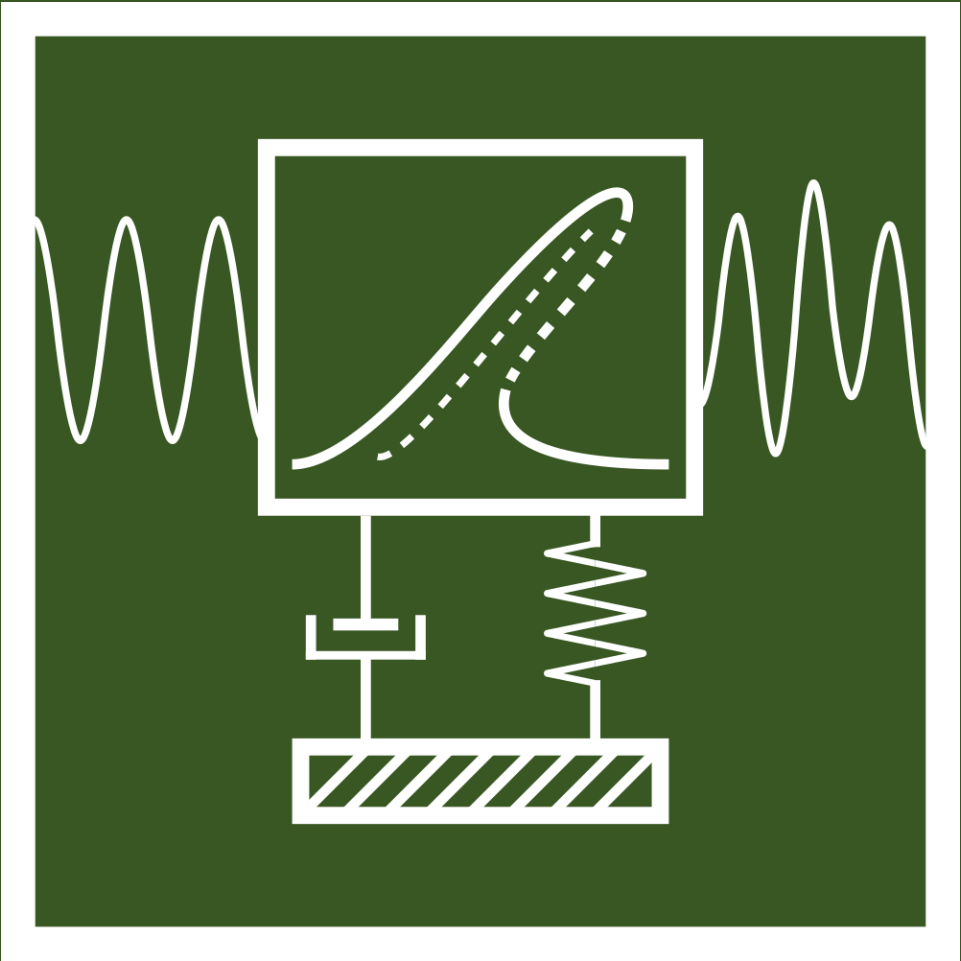


Investigation of vibrations of contacting elements using moiré method

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Abstract

In the performed investigation it is assumed that there are two beam type straight elastic parts. Left end of the first part and right end of the second part are assumed to be fixed. At the right end of the first part and at the left end of the second part the two beam type elastic structures are interconnected by an elastic flexible interconnecting element. Eigenmodes of the analyzed structure are investigated by using stroboscopic moiré techniques. Detailed results of investigations are presented.

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Introduction

In the performed investigation it is assumed that there are two beam type straight elastic parts. Left end of the first part and right end of the second part are assumed to be fixed. At the right end of the first part and at the left end of the second part the two beam type elastic structures are interconnected by an elastic flexible interconnecting element. Eigenmodes of the analyzed structure are investigated by using stroboscopic moiré techniques. Detailed results of investigations are presented. Investigation of vibrations of beam type structures is performed in [1]. Determination of frequencies of beam type structures is presented in [2]. Investigation of free vibrations of beam type structures is performed in [3]. Measurement of vibrations is described in [4]. Time averaged moiré methods are investigated in [5]. Investigation of vibrations of machines by moiré methods is presented in [6]. Hybrid experimental – numerical procedures using moiré techniques are described in [7]. Vibrations of machines by moiré methods are investigated in [8].

02

Investigation of eigenmodes of contacting elements

The first eigenmode of the contacting element is shown in Fig. 1. The second eigenmode of the contacting element is shown in Fig. 2. The third eigenmode of the contacting element is shown in Fig. 3. Typical results of stroboscopic moiré techniques are shown in the presented graphical images. From the obtained results it is observed that there are eigenmodes with predominantly bending vibrations, while there are some eigenmodes with predominantly longitudinal vibrations.

03

Conclusions

It is assumed that there are two beam type straight elastic parts. Left end of the first part and right end of the second part are fixed. At the right end of the first part and at the left end of the second part the two beam type elastic structures are interconnected by an elastic flexible interconnecting element. Eigenmodes of the analyzed contacting element are investigated by using stroboscopic moiré techniques. Typical results are shown in the presented graphical images. From the obtained results it is observed that there are eigenmodes with predominantly bending vibrations, while there are some eigenmodes with predominantly longitudinal vibrations. Typical graphical results of stroboscopic moiré techniques for investigation of vibrations of contacting elements enable to improve their dynamic performance.

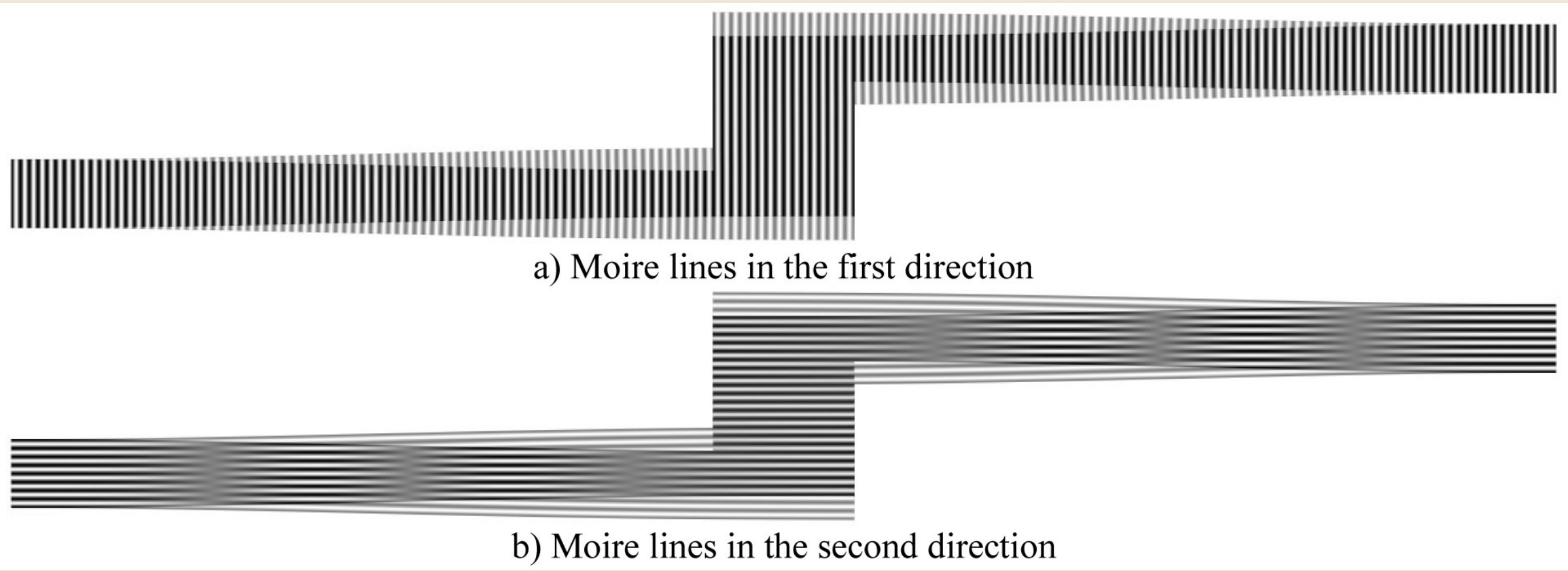


Fig. 1. Moiré images of the contacting element for the first eigenmode

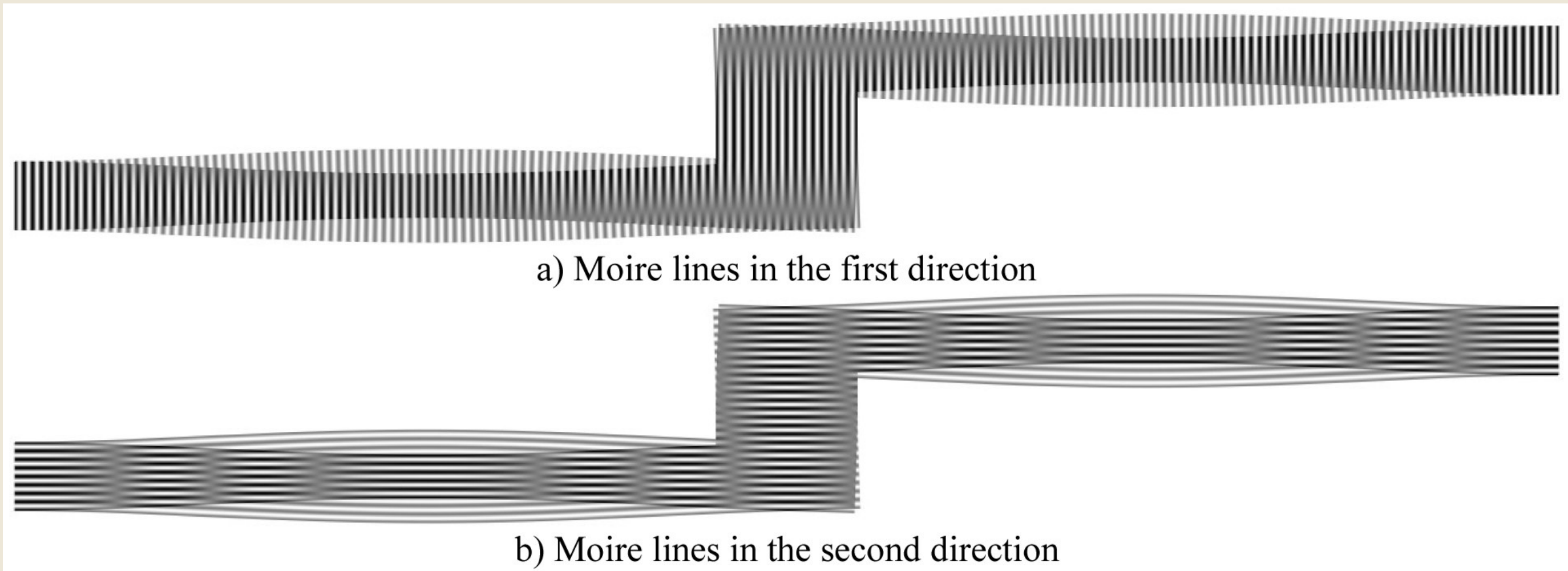


Fig. 2. Moiré images of the contacting element for the second eigenmode

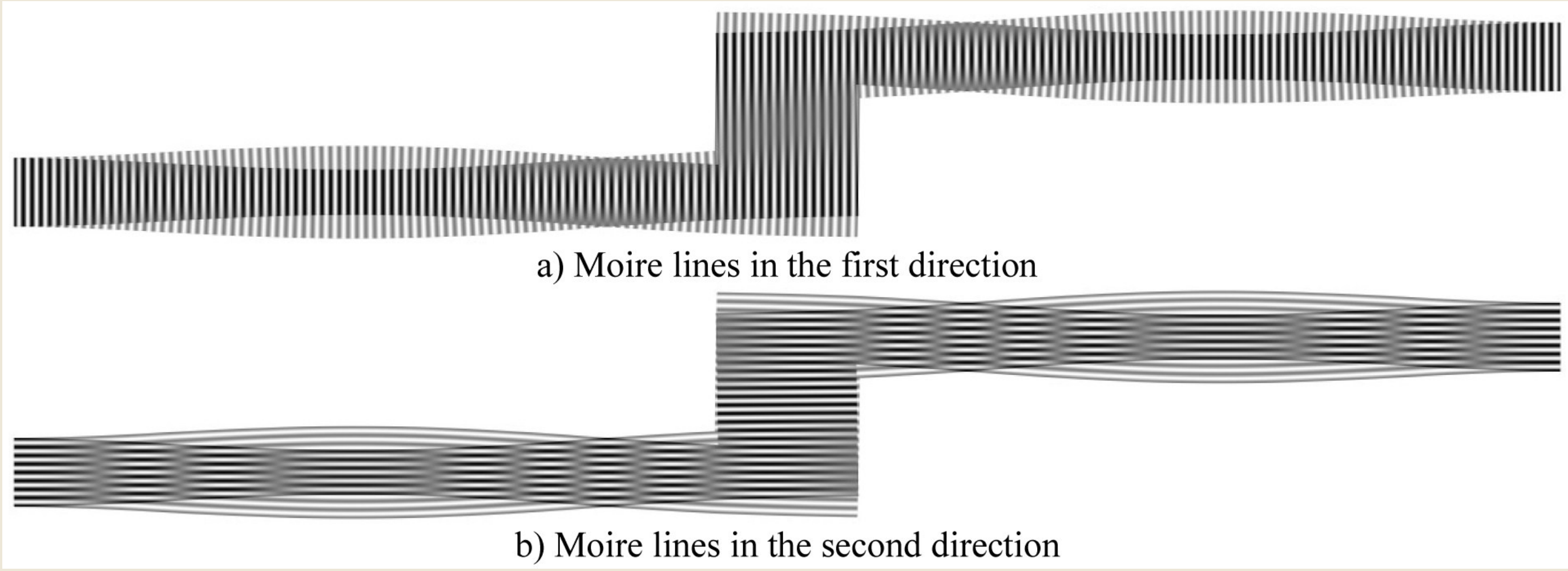


Fig. 3. Moiré images of the contacting element for the third eigenmode

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