VIBRATIONS INFLUNECE ON THE ACCELERATIONS FIELD IN THE CASE OF THE LINEAR-ELASTIC ROD OF A CRANK AND CONNECTING-ROD ASSEMBLY R(RRT)

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First of all, the movement equations of the linear-elastic straight Kinematic elements in plan-parallel motion are presented in the paper. These are obtained by using the Hamilton's variational principle. In order to obtain the dynamic response, the Laplace integral transforms and the finite Fourier transforms are applied. In the end it is presented the accelerations field in the case of the linear-elastic rod of some crank and connecting-rod assembly, the values obtained theoretically being compared with the obtained experimentally. Appling a iterative method, in [1] the longitudinal displacement fields, respective transversal was obtained, in first approximation, in the case of the free vibrations of the OA rod from the R(RRT) mechanism. In [2] it is given the accelerations field expression. If we stop the iterative process for displacements to third approximation and we place our in the concrete case in that $L=L_b=1[m]$, $r=0.07[m]$, then we obtain the numerical values of the accelerations such as appear in Figure 1, values comparable with the obtained experimentally, as in Figure 2, using an apparatus composed by WebDaq/100 acquisition interface, Bruel & Kjaer type 2635 and Robotron type M1300 load amplifiers and Bruel & Kjaer type 4382 accelerometers.

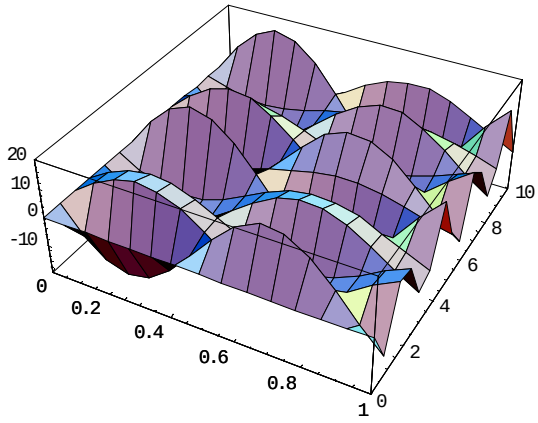

Figure 1. Accelerations field corresponding revolutions $n=237,3\left(\frac{rot}{min}\right)$

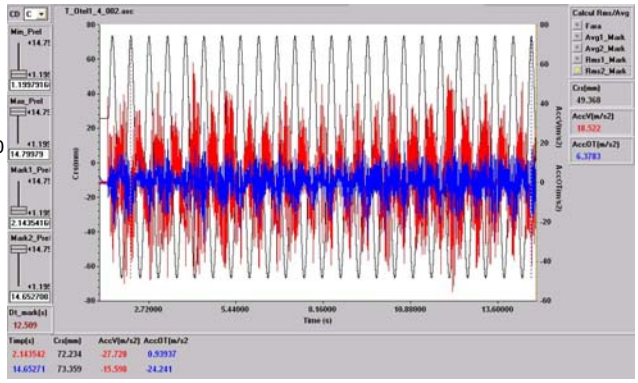

Figure 2. Accelerations field, obtained experimentally, corresponding revolutions $n=149,4\left(\frac{rot}{min}\right)$

This paper have big importance in the designing activity where, for a biger precision in the dimensioning calculations, it is imperatively necessary to take into account the vibrations influnce on the displacements field and on the accelerations field.

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