Abstract

One of important parameters in vibrations system must be known is natural frequency. The usually method use in calculate natural frequency in shaft and rotor are Transfer Matrice Method with distributed mass along axial shaft and rotor. In this method formulations wave very important. Because of gyroscopic effect, consequently wave number will be more large than Euler Beam.

If number of rotor N, transformations matrices (T.M) use in formulations is TM=2N+1. The final equations will be more complex to calculate. With Dunkerly manipulations equations founded new equations in quadratics Polynomial as "multiply rotor constant" as positions, dimensions and properties rotor relative to shaft. Using this equations calculations natural frequency more easy to be done.

The natural frequency results from mathematic models with gyroscopic effect was founded 0.7% – 1.4% for one rotor, 1.7%-9.36% for two rotor and 2.43%-4.46% for three rotor multiply to Euler bem. The experiments had been done compared with modelling have not significant error (2.84%).

Key word:
Bending vibrations, wave number of Euler beam, Natural frequency of Euler beam, whirling rotations, wave number of gyroscopic effect, Natural frequency of gyroscopic effect, multiply rotor constant.