Abstract

The research studies the thermal effect on the critical speed and on the distribution of amounts both the lateral and axial for vibration along the Dual rotor – system . Differal thermal distribution type and their influence on the critical speed and on the distribution of lateral amounts of vibration (eign mode) are adopted .The rotating system is assummed to be made of two coaxial rotor under effect of gyroscopic moments , The bearings are represented by their linearized dynamic properties known as the stiffness and damping coeffecient .The props that support the Dual rotor are modeled with elastic springs and dashpots ; The study is considered the effects of thermal on the Dual rotor system for constant temperarture of the two rotors , linear distribution on the critical speeds of the two shafts , eigen mode (Deflection , Slope , Shear force , Bending moment) and the value of whirl orbit (major and minor axis , phase angle) .The combined Finite element – Transfer matrix (F.E.T.M) technique was used to idealized the mathematical model of the rotating system . This technique is convenient in computer programming . It deals with matrices , which are smaller than those obtained by the conventional finite element technique .A computer program written in Fortran 90 has been developed , other's built , to embrace the theoretical analysis . This program is applicable for any arrangement of the Dual rotor and use program Matlab 6.5 , Ansys 11 to simplify work and to embrace the theoretical analysis From this research it has been found that the temperature affects the critical speed and the distribution of the lateral amounts of vibration .

The results showed the speed percentage when $(\omega 2=1.5*\omega 1)$ **first of thermal distribution between (T=25 C^o) and (T=75 C^o) of shaft1(24.88% , 29.38% , 13.62%) successively and shaft2(8.2% , 0.882% , 0.615%) successively will result in increasing the value of the eigen mode and the value of the whirl orbit in comparision with all distribution , second of thermal distribution between (Linear1)and (Linear2) of shaft1**

(49.5% , 31.21% , 29.97%) successively and shaft2 (0.497%, 0.409%,0.360%) successively will result in decreasing the value of the eigen mode and the value of the whirl orbit in comparision with first of thermal distribution .first of thermal distribution when $(\omega 1 = 1.5 * \omega 2)$ **between (T=25 C^o) and (T=75 C^o) of shaft1 (33.186% , 29.586% , 20.679%) successively and shaft2 (5.814% , 0.21% , 0.49%) successively will result in increasing the value of the eigen mode and the value of the whirl orbit in comparision with all distribution , second of thermal distribution between (Linear1)and (Linear2) of shaft1 (9.036% , 12.49% , 16.302%) successively and shaft2 (5.49% , 0.111% , 0.21%) successively will result in decreasing the value of the eigen mode and the value of the whirl orbit in comparision with first of thermal distribution .**

The eigen mode (Deflection , Slope , Shear force , Bending moment) and the value of whirl orbit (major and minor axis , phase angle) depends on the thermal distribution , rank of the critical speed and values of the rotating speed of the dual shafts.