DYNAMIC MODEL OF CYCLOIDAL SPEED REDUCER

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ABSTRACT: Cycloidal speed reducer is a very complex mechanical system and for studying its dynamic behaviour must be considered all its specifics. On the level of internal dynamic forces very big impact have: manufacturing errors of cycloid disc and other elements of reducer, assembly errors, unequal load distribution, ... On the basis of the models of external and internal gear trains, a dynamic model of a single - stage cycloidal speed reducer is developed in the paper. It is assumed that the values of the stiffness are constant and the excitation force time-variable function. The values of displacement, velocity, and dynamic force for single meshing are presented in this paper. The greatest impact on the dynamic force value has the coefficient of damping and coefficient of stiffness between cycloid disc and the ring gear.

KEY WORDS: cycloidal speed reducer, cycloid disc, dynamic model, dynamic force

DINAMIČKI MODEL CIKLOIDNOG REDUKTORA BRZINE

REZIME: Cikloidni reduktor brzine je veoma složeni mehanički sistem i za analizu njegovog dinamičkog ponašanja moraju se uzeti u obzir sve specifičnosti. Na nivou unutrašnjih dinamičkih sila značajan uticaj imaju: greške u proizvodnji cikloidnog diska i drugih elemenata reduktora, greške sklopa, neravnomerna raspodela opterećenja i drugo. Na osnovu modela spoljašnjih i unutrašnjih prenosnika, dinamički model jednog cikloidnog reduktora brzine razvijen je u ovom radu. Pretpostavljeno je da su vrednosti krutosti konstantne i da je sila pobuda vremenski zavisna funkcija. Vrednosti pomeranja, brzine, i dinamičke sile za jedan tip mreže su prikazani u ovom radu. Najveći uticaj na vrednost dinamičke sile ima koeficijent prigušenja i koeficijent krutosti između cikloidnog diska i prstenastoga zupčanika.

KLJUČNE REČI: cikloidni reduktor brzine, cikloidni disk, dinamički model, dinamička sila

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