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Numerical Study on the Static Characteristics of Novel Aerostatic Thrust Bearings Possessing Elastomer Capillary Restrictor and Bearing Surface

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Abstract : In this paper, a novel design of aerostatic thrust bearing is proposed and is analyzed numerically. The capillary restrictor and bearing disk are made of elastomer like silicone and PU. The viscoelasticity of elastomer helps the capillary expand for more air flux and at the same time, allows conicity of the bearing surface to form when the air pressure is enhanced. Therefore, the bearing has the better ability of passive compensation. In the present example, as compared with the typical model, the new designs can nearly double the load capability and offer four times static stiffness.

Keywords : aerostatic, bearing, elastomer, static stiffness
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