

عنوان مقاله:

Finite Elements Analysis of the Hyperelastic Impeller Rotating in the Self-Priming Pump

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خلاصه مقاله:

Volumetric self-priming pumps with deformable impeller blades are very common devices in the food industry, especially in the presence of viscous liquids that tend to foam or contain suspended solids, but also when working under vacuum with good suction capacity is needed. These pumps are characterized by a circular chamber with an eccentric, in which the impeller rotates: due to the continuous deformation of flexible blades, the liquid is moved up to the discharge. The exact evaluation, moment by moment, of the hyperelastic behaviour of the impeller represents a quite complex task, involving several miscellaneous phenomena. In this study a simplified quasistatic analysis by finite element discretization is proposed, able to evaluate with reasonable approximation the stress/strain state of the impeller blades during their rotation. Aspects such as material hyperelasticity, large displacements, large deformations, non-linearity in contacts, frictional and inertial forces were considered.

کلمات کلیدی:

Self-priming pumps, Flexible Impeller Pumps (FIPs), impeller blades, non-linearity, hyperelasticity, contacts

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