Cogeneration with multiple-disk type turbines
PhD dissertation
2007. Budapest University of Technology and Economics
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1. **thesis**

I made a model for fluid flow in between rotating disks and for energy transformation in connection with fluid flow. Velocity distribution along normal direction to the disk surface is simulated as channel flow, and velocity distribution along parallel direction to the disk surface is simulated as special free-jet flow. (Chapter 4.2.) This model is suitable for simulation of energy conversion of multiple disk type turbines at practical cases, and determination of optimal design. (Chapter 4.-6.2.) [S05], [S09]

2. **thesis**

I determined, that optimal pressure ratio ($\varepsilon = p_{out} / p_{in}$) is at $\varepsilon = 0.6$ concerning maximal efficiency, and is at $\varepsilon = 0.2$ concerning economical application viewpoint. (Chapter 6.3.) [S09]

3. **thesis**

I established, that optimal velocity ratio of peripheral speed at outer diameter and tangential component of inlet speed concerning inherent efficiency is $u/c_t = 0{,}45$ independent from pressure ratio either saturated or superheated inlet steam. (Chapter 6.4.) [S09]

4. **thesis**

I determined that one stage multiple disk type turbine reaches maximal inherent and effective efficiency at the range of $\varphi = 3\cdot10^{-5} - 10^{-4}$ in case of dry, saturated steam and at the range of $\varphi = 5\cdot10^{-5} - 2\cdot10^{-4}$ in case of superheated steam inlet, where φ quantity factor, which is dimensionless steam flow of the turbine. (Chapter 6.6.) [S09] ($\varphi = \frac{\dot{m}_{g1} / \rho_g}{D_k \cdot \pi \cdot H \cdot u_k}$)

5. **thesis**

I demonstrated, that both surface roughness of disks and outer diameter of disks have affect on optimal gap in between rotating disks. According to my results optimal gap value and applicable range is increasing parallel either by surface roughness increase or by outer diameter increase. (Chapter 6.7.1. – 6.7.2.) [S09]