ANALYTICAL CONTRIBUTIONS TO THE DEFINITION OF THE PELTON TURBINE CONTROL CHARACTERISTICS

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ABSTRACT

The paper has investigated the volume control by injector (provided with needle valve and servomotor for acting) of the Pelton turbine that suitably modifies the performances of the hydro-energetic power plant, permitting a variable electric conversion. Beginning from the definition of the control coefficient $k_r \in [1,0]$*, we have demonstrated the dependence between characteristic magnitudes, by obtaining characteristic magnitudes: input flow rate,* $Q(k_r)$*. velocity of the jet* $v_{jet}(k_r)$*, tangential velocity of the rotor* $u(k_r)$*, angular speed* $\omega(k_r)$*, speed* $n(k_r)$*, and input hydraulic power* $N_i(k_r)$*; the moment of the machine* $M(k_r^2)$*; powers: hydraulic, of the water jet* $N_{jet}(k_r^3)$*, mechanic of the turbine* $N(k_r^3)$ *and electric of the power station output* $N_b(k_r^3)$*; efficiencies: of the supply* $\eta_{aduct}(k_r^2)$ *and global, hydroelectric* $\eta(k_r^2)$*; ratio of the speed variation, obtained by a gear in order to enssure a constant speed for generator action* $i(k_r^{-1})$*. The study is accompanied by a numeric application. Relations permit a right control of the turbine Pelton in variable condition for exploitation, with minimum of errors and energetic loss.*

REFERENCES

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