SIMULATION OF CALCULATION OF MICRO HPP USING THE TECHNICAL AND TECHNOLOGICAL CHARACTERISTICS OF THE RESERVOIR AND GENERATOR

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The micro-HPP model consists of a hydraulic turbine and a synchronous generator. Block hydraulic turbine and governor (HTG) is a type of box with a hydraulic type - regulation system. The control system includes Proport-tionally -differential (PID) controller and servo control.
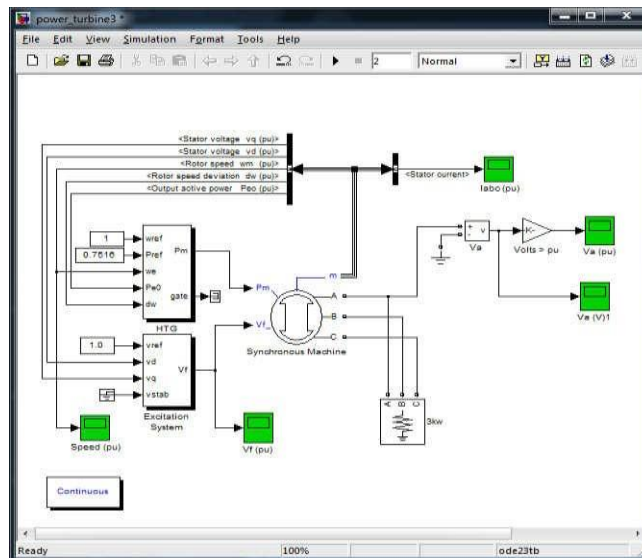

Figure 1. General scheme of the model

The first two inputs of the block are given the desired values of angular velocity (wref) and power (Pref). The third and fourth inputs of the block take the true value of the angular velocity (we) and the active power (Pe). The frequency deviation of the rotational angle of the synchronous generator (dw) rotor is fed to the fifth input. The output signals are mechanical power that must be delivered to the corresponding input (P m) of the synchronous machine block and to the opening value of the hydraulic turbine (door). The input levers are disconnected, and if the feedback signals are used to turn off the position, the speed is reduced.
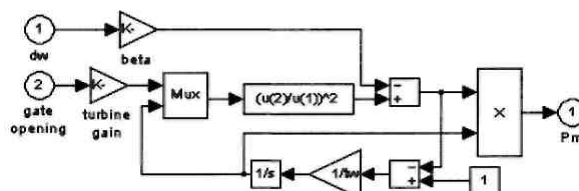

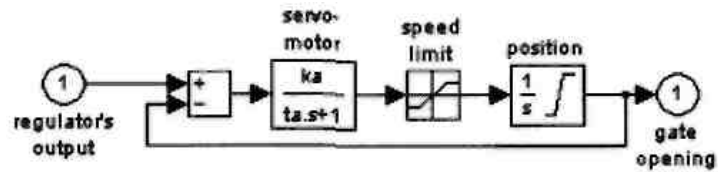Figure 2. Model of hydraulic turbine
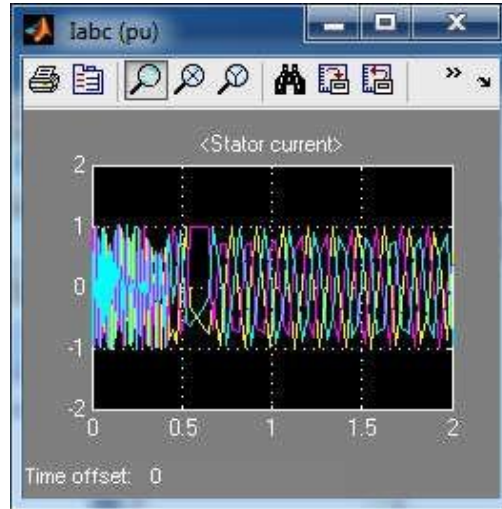
Figure 3. Servodivigatel models.

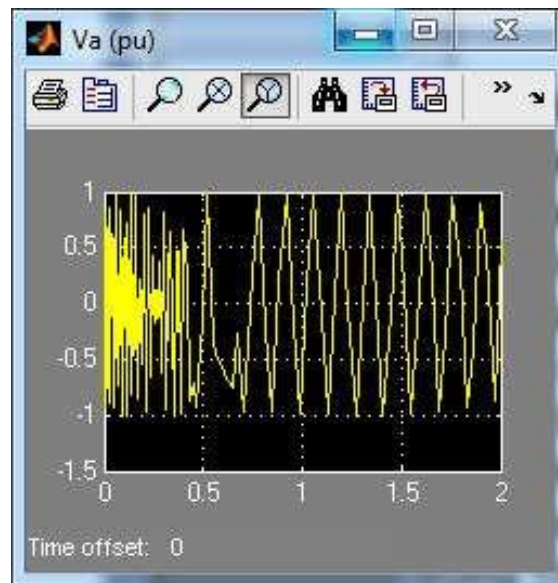Figure 4.Phase currents of the generator

Figure 5 .The output voltage of the generator phase C in relative units.

The following basic energy parameters were obtained based on the results of software development of the calculated model of joint operation of micro-hydroelectric power station and water basin:

- rotor speed;
- generator excitation voltage;
- phase currents of the generator;
- output voltage of the generator phase in relative units.

The simulation results allow us to estimate the efficiency of micro hydroelectric power stations designed using hydropower.