XtremeFlow™ Flow Network Modeling Software

The models used in XtremeFlow are based on first principle equations of fluid dynamics and thermodynamics. XtremeFlow can be used for single or two phase fluid and gaseous systems. The basic equations for a hydraulic network are derived by XtremeFlow using the three conservation laws for a physical system:

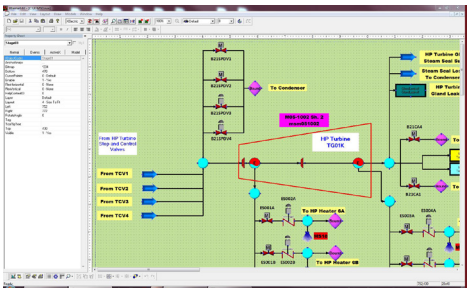
- Conservation of Mass (Continuity)
- Conservation of Energy (First Law of Thermodynamics)
- Conservation of Momentum (Newton's Second Law)

The modeling includes compressibility, explicit solution of mass and energy equations at each node, high-fidelity heat exchanger models, variable heat transfer coefficients, and a highly sophisticated heat transfer package.

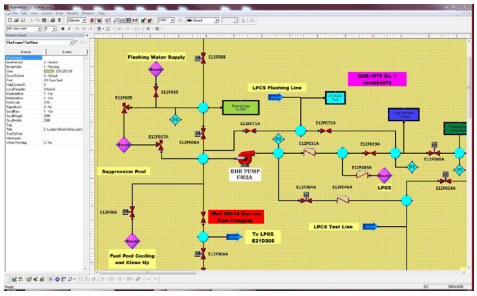
The XtremeFlow component libraries contain numerous components required for modeling hydraulic plant systems, including valves, pumps, heat exchangers, tanks, etc. Two-phase components are supplied, such as two-phase tanks, heat exchangers, moisture separators and turbine extraction nodes.

In the above case, the check valves on the discharge of the Auxiliary Feed Pumps have a variable (CKV_1_LR) for the leak rate past the close seat. This leakage can be a function of the D/P and temperature of the Feed Water, and as such, the fluid at the impellor of an idle pump can reach saturation conditions.When the pump is subsequently started, the cavitation effects will uncover the impellor of the pump (mimicking a pump that is air-bound), and no fluid is pumped.

In addition, model changes utilizing XtremeFlow (and all other XtremeTools) are much simpler than models generated via manual coding procedures. Adding valves, pumps, tanks and the associated piping can be accomplished without generating a new matrix solution. This translates into ease of use for all technical level of users.



XtremeFlow™ Main Steam Model



XtremeFlow™ Residual Heat Removal Model

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