

The example 2 is supplied to provide the reader with the data of an additional case, in order to apply the same procedures shown in the book.

As can be seen in the flowsheet (Doc2001), the example proposed is a combined cycle gas turbine (CCGT).

The gas turbine is simulated with blocks C101 (air compressor), R101 (combustion chamber), T102 (Expansion turbine). In the case proposed the gas turbine is supplied with air (stream 10101) and a preheated (E101) natural gas (10201).

The flue gases from the gas turbine (stream 10302) go through a heat recovery steam generator (HRSG), which has been simulated making use of heat exchangers blocks, each one for the appropriate objective in order to recognize the economizers, vaporizers and superheaters of each of the three pressures of the steam cycle.

The steam generated in the HRSG, is expanded in three different blocks, simulating the high (T201), medium (T202) and low pressure (T203) bodies of the steam turbine. The exhaust steam enters the condenser simulated by a mixer (M202), to join the steam used in the natural gas preheater (E101) with the steam exiting the low pressure turbine (T203), and the heater E201 responsible of changing the water state to liquid.

The cooling water used in the condenser has been simulated, as well as the pump needed.

The pumps of each pressure step are also included in the simulation.

In the process, the blocks C101 and T102 are joined by a mechanic shaft, to give the power generated in T102 to block C101, so that the power generated by the gas turbine, and exiting the compressor is the difference between the one generated by T102 (gross power) and the one consumed by C101 (self-consumption) giving the net power of the gas turbine, which enters the alternator to generate electricity.

Also, the steam turbine is usually joined by a single shaft to a different alternator. In this case, the power generated by each turbine increase the power of the shaft.