1077-G5-1378   **Ellina V. Grigorieva*** (`egrigorieva@twu.edu`), 8800 Sagebrush Trail, Aubrey, TX 76227, and **Evgenii N. Khailov** and **Andrei Korobeinikov**. *Reduction of the operation cost via optimal control of an industrial wastewater biotreatment process.*

A model of an industrial wastewater bio-treatment by means of autothermal thermophilic aerobic digestion (ATAD) is created and investigated. The model is described by a nonlinear system of three differential equations with one bounded control, the aeration rate. An optimal control problem of minimizing energy consumption on the given time interval is stated and solved analytically with the use of Pontryagin Maximum Principle. Dependence of the optimal solution on the initial conditions and model parameters are established. Results of this study can be immediately applied to practical ATAD reaction design. . (Received September 19, 2011)