Data Analysis and Ecological Mapping in An Industrial Plant

유창규[*], B. Ushayanan[1], 김현주[2], 김영황[2], 이인범[2]

경희대학교 환경응용화학대학; [1]Anna Univ., India;

[2]포항공과대학교

(ckyoo@khu.ac.kr[*])

Biological processes have different behavior patterns depending on the influent loads, temperature, the activity of microorganisms and so on. It has been known that a combination of several models can provide a suitable approach in such case. In the present study, a framework of generative topographic mapping (GTM) was developed for elucidating and diagnosing multiple process status of an industrial plant. This process diagnosis maps the data set to the visualized latent space and predicts the advanced nitrogen and phosphorous removal performances through high-dimensional mapping. The results from an industrial plant demonstrate that a high-dimensional nonlinear mapping extracts the operation stability of a biological wastewater treatment process from data set, can identify subtypes of microbiological status and improve the interpretability of the nutrient removal performances. It shows to explain how it can be used to support decision-making in ecosystem and is very efficient to execute corrective actions well in ecosystem for optimizing enhanced biological nutrient removal before a dangerous situation occurs.