Fed-batch processes play a very important role in chemical and biochemical industry. A wide range of processes in biochemical industry are based on fermentations and these are most often carried out as fed-batch processes. Operation of these processes using standard regulatory control schemes is not possible due to their non-linear time varying nature and limitations in the process equipment. In this project a methodology for control and optimization of such processes will be developed based on the use of mathematical models.

This project is a part of the Novozymes Bioprocess Academy which is a newly established cooperation between Novozymes A/S, The Department of Chemical Engineering and Biocentrum at DTU.

The process studied is fermentation of *Aspergillus Oryzae* for production of the enzyme amylase. The fermentation is started as a batch process and when a certain biological stage is reached feed dosing begins. A sketch of the process is given in the figure below. Several manipulable inputs, such as substrate feed, ammonia feed and air flow, are used to control the process and keep it within the desired operating region. Measurements of output variables containing valuable information about the progress of the process are constantly monitored by the operators.

Operational data for development of mathematical models for the process is supplied by Novozymes A/S where future experiments for data acquisition and validation of the developed methods also will be carried out.