ABSTRACT

Control method of processes of synthesis of chemical product

A control method for a process of synthesis of at least one chemical product in an equipment comprising at least one reactor (R) which can be assimilated to a perfectly mixed reactor, in which manipulated variables (GC) allow it to act on the course of the process in order to make one or more variables related to the properties of the product and/or to the running of the process, which are called controlled variables (GR), equal to the corresponding set points (C_{GR}), the said method including the following steps:

(a) input of set points concerning the controlled variables (C_{GR});

(b) computation, by means of a prediction unit (OP), of predictions of the controlled variables (P_{GR}), based on measurements of the process manipulated variables (M_{GC});

(c) use of a control unit (OC) to compute the set points of the process manipulated variables (C_{GC}), based on the set points (C_{GR}) and the predictions (P_{GR}) of the controlled variables;

(d) transmission of the set points of the process manipulated variables (C_{GC}) to actuators, in order to act on the course of the process;

in which the prediction unit (OP) is based on a mathematical model of the process, called a direct model (M) and is designed in such a way that the mass M_{XR} of at least one constituent (X) in the reactor (R) is predicted by the equation:

$$M_{XR} = LAG\ (F_{XRin} \cdot \tau_X,\ \tau_X)$$

in which:

- F_{XRin} is the mass flow rate of the constituent X entering the reactor R;

- τ_x is the residence time of x [sic] in the reactor;
- the function y = LAG (u, τ) is the solution of the differential equation

$$u=\tau\cdot\frac{dy}{dt}+y$$

calculated with the instantaneous value of u and of τ, and with the last computed value of y.

Figure 7.