PMP *CLASS* 20 / 30

Evaluation of Classification Processes by standardised Tromp Curves

CLASS 20: DESCRIBING A PROCESS STATE

This description of a classification process in the actual operating state will be realised by the state variables

Cut size xt and
Bypass value T0

The description is completed by the so called

standardised tromp curve

as the particle size related characteristic curve.

The standardised tromp curve is a specific transformation of the real tromp curve. The partition numbers are reduced to a bypass value “0”. The particle size is substituted by a dimensionless particle size after relating it to the actual cut size.

EVALUATION OF EXPERIMENTAL DATA

Based on the characteristic values xT and T0 of the real tromp curve (see Class 10) there are different possibilities for assigning the values of the state variables. The transformation mentioned above will be performed using the chosen values. Furthermore each state can be equipped with its recovery- and sharpness of cut values.

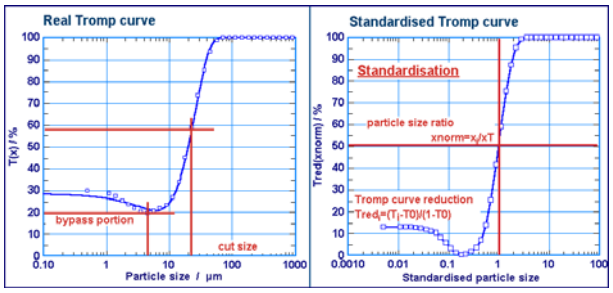

Fig 1: Conversion of the real tromp curve to the standardised one

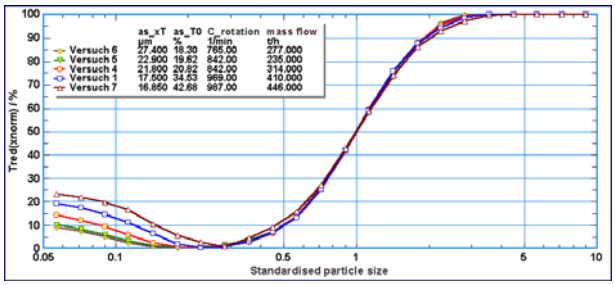

Fig 2: Standardised tromp curves of different process states

The evaluation can be performed for different process states. The values of the state variables differ significantly between the original states. However, if the standardised tromp curve does nearly coincide (see. Fig. 2), the further modelling will be performed via the two state variables (see Class 30).

CLASS 30: EMPIRICAL MODEL

This module supports the determination and application of a classifier characteristic field for the cut size and the bypass value in connection with the medium standardised tromp curve. This characteristic field represents the models for calculating the values of the state variables depending on significant influencing variables.

MODEL BUILDING

Based on the results of the prior use of the module **CLASS 20** it is quite simple to derive the empirical classifier model. Using the experimental data of different process states the specific characteristic field of the classifier can be determined with respect to the state variables (cut size, bypass value) via a power product approach. Furthermore an accordance check for the individually standardised tromp curves is performed. The validity range of the model is set from experimental conditions. The model accuracy is determined by the deviations of determined and predicted values.
This obvious method can be verified quickly. According to the demands robust models can be derived from only a few experimental data (3 data sets). Further experimental data will improve the models.

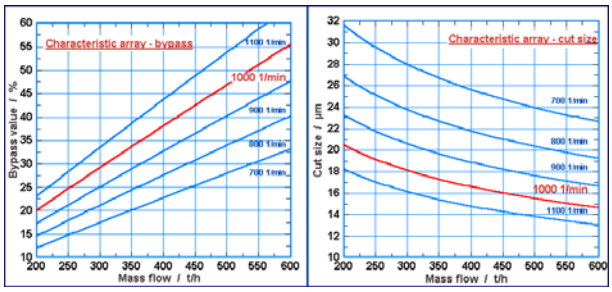

Fig. 3: Characteristic field for the bypass value T0 (left) and for the cut size xT (right) in dependence of mass flow and rotational speed

MODEL APPLICATION

The model is applied for optimisation- and planning tasks, which have to be solved for an individual classifier as well as for a classifying stage. So the PMP-Software contributes to solving more comprehensive process engineering tasks concerning processing systems.

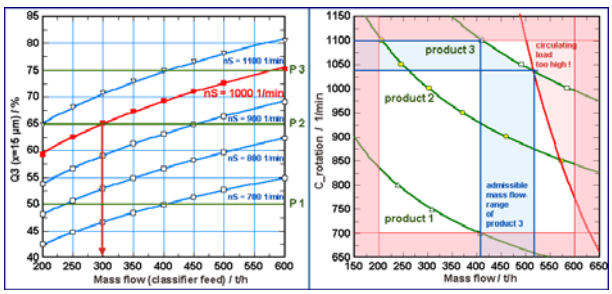

Fig. 4: Results from calculations with the classifier model: Relation between throughput and fineness (left). Operating ranges with respect to different product requirements (right).

GRAIN*soft* GmbH D-09599 Freiberg +++ Tel. +49 3731 6705 0 Fax +49 3731 6705 45 +++ eMail info@grainsoft.com