Calibration of a genetic network model for maternal and gap genes in Drosophila

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We propose a differential equations based model for the calibration and validation of maternal and gap-genes in *Drosophila* early development. We apply an mRNA reaction-diffusion approach in order to describe the formation of the gradients of maternally produced proteins Bicoid (BCD), Caudal (CAD), Hunchback (HB) and Tailless (TLL). Resting upon these results, we analyze the cross regulation mechanism between the gap-genes pair Hunchback-Knirps (KNI). We calibrate and validate the models by single- and multi-objective evolutionary optimization algorithms and we compute the associated Pareto fronts.