Ganzhur M.A., Romanov D.L., Borisenko I.M., Kobylko A.E. (Rostov-on-Don, Russia) — **Simulation of systems using fuzzy dual Petri nets.**

Consider the structure of a fuzzy dual Petri net. The FPN structure is defined by the parameters FPN = (P, T, I, O, D, W, U, Th, M) where: P = (p1, p2, ... pm) is a finite set of positions. Each element pi = (pi1; pi0) consists of a pi1-straight position, and a pi0-inverse position; with the condition pi = pi1 $\bigcup$ pi0; T = (t1, t2,... tn) is a finite set of transitions; I: P $\times$ Tп,® [0,1] is the input matrix with the order m $\times$ n. If the position pi is connected by an arc with a transition tj, then the element of the matrix I, Ii j = 1, otherwise Iij = 0; O: T $\times$ Pп,® [0,1] is the output transition function with the order m $\times$ n. If the transition tj is connected by an arc with the position pi, then the matrix element O, Oi j = 1, otherwise Oij = 0; D = {d1, d2, ... dm} represents a set of statements ∞: P $\rightarrow$ [0,1] - a function that displays the places of real values вЂ<вЂ<within [0 1]. β: P $\rightarrow$ D function, which displays assertions. W: P $\times$ T $\rightarrow$ [0,1] is an input function and is represented as an m $\times$ n matrix. In the matrix, the input value Wij $\in$ [0,1] is the weight associated with the input location. For one transfer the sum of weights for all input places = 1. U: T $\times$ P $\rightarrow$ [0,1] is the output function and is represented as an m $\times$ n matrix. The input value in the matrix U, μij $\in$ [0,1] is equal to the value of the factor of certainty (μ), which determines the transition tj, can affect its output places pi; Th: O $\rightarrow$ [0,1] is the output function and is represented as an m $\times$ n matrix, the entry in the matrix τij $\in$ [0,1] shows the exit threshold in the pi position from the transition tj to τij = ∞, if this is not the output position . M dynamic input signal and immediately influence the dynamic behavior of DFPN.M = (∞ (p1), ∞ (p2), ..., ∞ (pm)) T The initial marking is denoted by pќ‘Ђ0. The structure of the Petri net contains only fragments corresponding to the production rules. By building and analyzing models of systems based on the Petri net, it is possible to reveal the presence of desirable or undesirable properties, which ensures the safety of the model itself and the data entered into it.

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This work was supported by the RFBR (project 16-01-00184).