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Combinatorial and operator approaches to RED modeling

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Abstract. In the study of a phenomenon it is necessary to construct a model of this phenomenon. The models differ in their expressive properties, degree of maturity, requirements. We need quantitative and qualitative studies of models. We want to get the whole range of models from first principles. One of these methodologies is the method of stochastization of one-step processes. As a result of application of the methodology to the investigated phenomena we can get more than one mathematical model (the whole family of models). We can specify the preferred methods of investigation for each model of the family. Thus, we are expanding the range of methods for studying the phenomenon under investigation. In the article, using RED algorithm as an example, we will illustrate different approaches to framework of the method of stochastization of one-step processes.

Keywords: stochastic differential equations, master equation, Fokker–Planck equation, active queue management, random early detection
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