BASIC MODEL OF COMBUSTION OF A MIXTURE OF HYDROCARBONS AND ITS PARAMETRIC ANALYSIS

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Abstract: A basic model of the combustion of the mixture of two hydrocarbons is considered. On the basis of the developed approaches of parametric analysis, the dependences of steady states of all dimensionless parameters are built. Bifurcation curves of multiplicity and neutrality are calculated that has highlighted areas of multiplicity of steady states and of changes of their type of stability in the parameter space. Conditions for the appearance of three and five steady states have been found as well as self-oscillating combustion modes. It has been shown that the quality of a mixture of hydrocarbons (ratio of the partial pressures) significantly affects the stationary and oscillating combustion modes.

Keywords: mathematical model; combustion of a mixture of hydrocarbons; parametric analysis; multiplicity of steady states; autooscillations

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