On boundary value problems for nonlinear parabolic systems

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The initial boundary value problems for systems of two nonlinear parabolic equations are studied when the conditions with respect to the time variable are given only for one of the unknown functions. The problems are considered in the case where along with the initial data for one of the functions either the value of the same function is given at the final moment of time or the integral of this function with respect to time is known and the domain of the space variables is bounded. The boundary conditions are taken of the Dirichlet type. The sufficient conditions for existence and uniqueness of a strong solution to these problems are established. The existence of the solution to the problem with the initial and final data for one of unknown functions is proved in two steps. In the first step we establish the existence of the solution to the problem for that first function as an inverse problem of recovering an unknown integral of the second function on the time segment as a source function. The second step consists of finding the second function as the solution of an appropriate problem with the boundary data provided that the first function and integral of the second function with respect to time variable are known.