On the stability criterion for an implicit evolution problem, based on a system of two nonlinear parabolic equations

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We construct an energy identity for an implicit evolution problem, which is based on a non-autonomous system of two nonlinear parabolic equations. From the energy identity, we construct a Lyapunov function and derive the conditions under which the null solution to the problem is stable or unstable. In other words, we use the direct Lyapunov stability/instability criterion for the null solution to the said implicit evolution problem. Problems of this nature occur either in heat transfer through surface radiation or permeable boundary Navier-stokes flows. The criterion thus derived will be tested on the two models describing the preceding phenomena. The existence of the 'weak' solution to this problem was confirmed in [1]. The computational confirmation of the solution to the problem appears in [2].

References

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