ADDENDUM TO THE ARTICLE "THE STABILITY OF A SYSTEM OF PARALLEL BOILING CHANNELS"*

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Inzhenerno-Fizicheskii Zhurnal, Vol. 10, No. 4, pp. 550–551, 1966

UDC 536.423.1

In the above-mentioned article we made the following errors. In formulas (8) and (9) N should be written for N^3, i.e., (8) and (9) should read

$$-\overline{\Delta P_1} = \frac{2V_1}{N}\sum_{j=1}^{N}\frac{\overline{\Delta W_{\text{in}\cdot j}}}{(W_{\text{in}\cdot j})_0}, \quad (8)$$

$$\overline{\Delta P_3} = \frac{2V_2}{N}\sum_{j=1}^{N}\frac{\overline{\Delta W_{\text{out}\cdot j}}}{(W_{\text{out}\cdot j})_0}. \quad (9)$$

Hence it follows that the parameters Φ_{12} and Φ_{22}, which describe the stability of the system with respect to general fluctuations, evidently do not depend on parameter N

$$\Phi_{12} = V_1 + U_1; \quad \Phi_{22} = V_2 + U_2.$$

Therefore the example given in the article of the dependence of the stability of a system on the number of channels is invalid. In the conditions of the example the stability is independent of the number of channels (when $N \geq 2$).

The stability of a system will depend on the number of channels, however, in the following case. Let us suppose that when the number of channels in the system is varied, the parameters describing the steady regime of each channel do not vary. We shall consider, further, that the heat carrier source and the steam consumer are turbulent resistances of constant value,

$$P_0(N) - P_1 = a\left(\sum_{j=1}^{N} W_{\text{in}\cdot j}\right)^2 \quad (a = \text{const}),$$

$$P_3 - P_4(N) = b\left(\sum_{j=1}^{N} W_{\text{out}\cdot j}\right)^2 \quad (b = \text{const}).$$

Then

$$\Phi_{12} = V_1'N^2 + U_1; \quad \Phi_{22} = V_2'N^2 + U_2,$$

where V_1' and V_2' are the pressure drops in the heat carrier source and the steam consumer at a heat carrier flowrate equal to the nominal rate through one channel of the system.*

The stability conditions will take the form

$$[\Phi_{22}(N),\ \Phi_{12}(N)] \in D_0, \quad [\Phi_{22}(0),\ \Phi_{12}(0)] \in D_0.$$

As N varies from 0 to ∞, the points $[\Phi_{22}(N), \Phi_{12}(N)]$ are located on the arc

$$\Phi_1 = \frac{V_1'}{V_2'}\Phi_2 + \Phi_{12}(0) - \frac{V_1'}{V_2'}\Phi_{22}(0), \quad U_2 \leqslant \Phi_2 \leqslant P_{20}. \quad (A)$$

Depending on the mutual position of arc (A) and the curve (11) in the plane (Φ_2, Φ_1), the following possibilities may be realized:

1. The arc (A) lies wholly above the curve (11), and the system is stable for any N.

2. The arc (A) intersects the curve (11) once. Then: a) if the point N = 1 lies below the curve (11), the system is unstable for any N; b) if the point N = 1 lies above the curve (11), the system is unstable when $N \geq 2$.

3. The arc (A) intersects the curve (11) twice. Then the system is either stable for any N, or numbers m_1 and m_2 exist such that, when $m_1 < N < m_2$ the system is unstable, and when $N < m_1$ and $N > m_2$ it is stable.

*Since $P_4 \geq 0$, $\Phi_{22} \leq P_{20}$. Hence the maximum possible number of channels in the example considered is $N_{\max} \leq E\left(\sqrt{(P_{20} - U_2)/V_2'}\right)$.

*IFZh [Journal of Engineering Physics], 8, No. 3, 1965.

20 September 1965 Gor'kii Technical Physics Institute