NOMENCLATURE

\( a \) – thermal diffusivity, \( m^2/s \)
\( A_c \) – area of the undisturbed flow, \( m^2 \)
\( A_v \) – reduced area, \( m^2 \)
\( d_i \) – maximum dimension of the oval profile of the rod, \( m \)
\( d_h \) – hydraulic diameter, \( m \)
\( D_i \) – effective coefficient of diffusion
\( F \) – open area of the bundle, \( m^2 \)
\( F_{rods} \) – total cross-sectional area of rods in the bundle, \( m^2 \)
\( G, g \) – flow rate of the coolant, \( kg/s \)
\( i, h \) – acceleration due to gravity, \( m/s^2 \)
\( I \) – momentum transfer, \( kg/(m^2\cdot s) \)
\( l \) – diffusion length, \( m \)
\( m \) – distinctive length, \( m \)
\( m_k \) – bundle porosity with respect to the coolant, \( F/F_{rods} \)
\( n \) – number of rods in the bundle
\( p_{k} \) – pressure in the cell, \( N \)
\( \text{rem} \) – root-mean-square;
\( s \) – rod spacing, \( m \);
\( T, t \) – temperature, \( K \)
\( \text{pitch of the wire wrapping, m} \)
\( u \) – flow velocity, \( m/s \)
\( x \) – bundle length, \( m \)
\( Q, q \) – heat flux, \( W/m^2 \)
\( y_{kx} \) – width of the velocity profile, \( m \)
\( \alpha \) – heat transfer coefficient, \( W/(m^2\cdot K) \)
\( \beta_p \) – coefficient of interchannel mixing
\( \beta_v \) – coefficient of volumetric expansion
\[ \delta_{k,n} \quad \text{characteristic momentum mixing length} \]
\[ \Delta h \quad \text{pressure difference on the Pitot tube, N} \]
\[ \varepsilon_q, \mu_q \quad \text{thermal diffusivities, m/s} \]
\[ \varepsilon_c, \mu_c \quad \text{turbulent viscosities, m/s} \]
\[ \varepsilon \quad \text{blockage ratio of the flow area, } \varepsilon = A_n/A_c \]
\[ \varphi \quad \text{angle, } ^\circ \]
\[ \chi \quad \text{shape factor} \]
\[ \lambda \quad \text{thermal conductivity of the coolant, W/(m\cdot K)} \]
\[ \nu \quad \text{kinematics viscosity, m}^2/\text{s} \]
\[ \Pi_{k,n} \quad \text{length of the gap in which the cells interact, m} \]
\[ \rho \quad \text{density, kg/m} \]
\[ \tau \quad \text{shear stresses, N/m} \]
\[ \xi \quad \text{resistance coefficient of the bundle} \]
\[ \psi \quad \text{relative heat transfer coefficient} \]
\[ \zeta \quad \text{resistance coefficient of the spacer grid} \]
\[ \text{Fr}_m \quad \text{dimensionless number, characterizing the} \]
\[ \quad \text{intensity of the flow swirl in the bundle of rods} \]
\[ \quad \text{with a wire wrapping (modified Froude number)} \]
\[ \quad \text{Fr}_m = T^2/d_{h,d_v} \]
\[ \text{Pr} \quad \text{Prandtl number, (Pr = } \mu c_p/\lambda) \]
\[ \text{Nu} \quad \text{Nusselt number, (Nu = } \alpha d_h/\lambda) \]
\[ \text{Ra} \quad \text{Rayleigh number, (Ra = } g \beta \Delta T b^3/\nu a) \]
\[ \text{Re} \quad \text{Reynolds number, (Re = } u d_h/\nu) \]
\[ \text{Le} \quad \text{Lewis number, (Le = } \rho c_p D_v/\lambda) \]
\[ \text{St} \quad \text{Stanton number, (St = } \alpha/c_p \rho u) \]

**Subscripts and superscripts**

\[ \infty \quad \text{in the free flow} \]
\[ \text{ad} \quad \text{adiabatic} \]
\[ b \quad \text{bundle} \]
\[ c \quad \text{calculated} \]
\[ ch \quad \text{channel} \]
\[ cr \quad \text{critical} \]
\[ en \quad \text{entrance} \]
\[ ex \quad \text{experiment} \]
\[ f \quad \text{conditions as to the flow temperature} \]
\[ i \quad \text{cell number} \]
\[ is \quad \text{isolation conditions} \]
$j$ — surface number

$k, n$ — between the cells $k$ and $n$

$lar$ — laminar

$q$ — heat

$r$ — rough

$ran$ — random

$rem$ — root-mean-square

$ss$ — self-similar

$sg$ — spacer grid

$sh$ — shell

$sm$ — smooth

$st$ — stabilization

$syst$ — systematic

$t$ — tube

$ts$ — two-sided

$w$ — conditions at the wall

$\tau$ — friction

**Abbreviations**

DARS — Lithuanian abbreviation for calculation of gas-cooled reactors

$FA$ — fuel assembly

$MVL$ — maximum velocity line

$N$ — normal

$PMV$ — point of maximum velocity

$PN$ — principal normal

$SG$ — spacer grid