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Nomenclature

General

DR	Decay ratio, see equation (2.26), page 17
λ	Eigenvalue, see equation (2.15), page 15
n_u	Number of state variables leading to algebraic equations, page 12
n_x	Number of state variables leading to differential equations, page 12
ω	Imaginary part of the eigenvalue, page 16
σ	Real part of the eigenvalue, page 16
τ	Time, page 12
u	State variable that leads to algebraic equations, see equation (2.3), page 13
x	State variable that leads to differential equations, see equation (2.3), page 13
T	Transpose operator, page 52

Matrices

$\mathbf{A}_\lambda$	Stability contribution matrix, page 63
$\mathbf{A_s}$	Matrix describing the linearized system, see equation (2.12), page 14
B	Diagonal matrix, distinguishing differential and algebraic variables, page 36
E	Matrix with the right eigenvectors as columns, page 15
F	Matrix with the left eigenvectors as columns, page 15
L	Lower triangular matrix, page 38
U	Upper triangular matrix, page 38

Neutronics

β	Total fraction of delayed neutrons, page 134

C Precursor density, page 134

D_1 Fast diffusion constant, page 134

$H(\tau_1, \tau 2)$ Decay heat due between τ_1 and τ_2, page 140

J Neutron current, page 135

K Total energy released per fission, $3.204e^{-11}\,j$, page 140

λ_m Decay constant of delayed group d, page 138

ν_1, ν_2 Number of neutrons generated per fission, page 135

$\overline{\varphi}_1 \overline{\varphi}_2$ Cell averaged neutron flux, page 134

q''' Volumetric heat generation rate (from nuclear fission and decay), page 139

Σ_{a1}, Σ_{a2} Absorption cross sections, page 134

Σ_r Scattering cross section from group 1 to 2, page 134

Σ_{f1}, Σ_{f2} Fission cross sections, page 134

V_1, V_2 Neutron velocity of energy group 1,2, page 134

X Neutronic coupling coefficient, page 136

Y Neutronic coupling coefficient, page 136

Subscripts/Superscripts

c Cladding, page 141

f Fuel, page 141

fl Fluid, page 153

FW Feedwater, page 147

g Saturated vapour, page 146

gp Gap between pellet and cladding, page 141

j Channel number, page 150

JT Jet pump, page 150

l Liquid, page 146

lb Liquid in bypass, page 153

m Two phase mixture, page 146

sat Saturation, page 147

SL Steam line, page 147

w Wall, page 146

Thermal Conduction

c Specific heat capacity, page 141

M_c Number of cladding zones, page 142

M_f Number of fuel zones, page 142

R_f Fuel radius, page 141

$\overline{t}$ Node averaged temperature, page 142

$t_{f,i}$ Temperature of the fuel in zone i, page 141

Thermal-Hydraulics

α Vapor void fraction, page 152

A Cross sectional area, page 146

A_c Cross sectional area of flow channel c, page 145

c_I User defined coefficient, page 152

$c_{p,l}$ Specific heat capacity (of the liquid) at constant pressure, page 149

d_h Hydraulic diameter, page 146

f_l Single phase Darcy friction factor, page 146

Γ Vapor generation rate, page 153

G_m Mass flux, page 146

g_z Gravity constant, page 146

$\overline{h}_c$ Convective heat transfer coefficient, page 153

h_{fg} Enthalpy of evaporation, page 149

h_g Enthalpy of vapor, page 149

h_l Enthalpy of liquid, page 149

j_m Mixture volumetric flux, page 146

L_i Length of segment i , page 149

M Momentum of coolant along a closed contour, page 150

m Mass, page 151

Φ Two phase friction multiplier, page 151

P Pressure, page 147

P_syst System pressure, page 147

q'_w Linear heat generation rate, page 153

ρ_f Density of saturated liquid, page 147

ρ_g Density of saturated vapor, page 147

ρ_l Density of subcooled and super-heated liquid, page 147

ρ_m Mixture density, page 147

t_{sat} Saturation temperature, page 147

S Slip, page 152

t_l Temperature of the liquid, page 153

t_w Temperature of the cladding surface, page 153

u_g Specific internal energy of saturated vapor, page 149

u_l Specific internal energy of liquid, page 149

V Volume of the node, page 151

W_g Mass flow rate of the gas, page 152

w_g Phasic velocity of the gas, page 152

W_l Mass flow rate of the liquid, page 152

w_l Phasic velocity of the liquid, page 152

ξ Heated perimeter, page 150

$\zeta_{1,2}$ Form loss coefficient, page 149

Vectors

e Right eigenvector, page 15

f Left eigenvector, page 15

f System function of state variables **x**, see equation (2.1), page 12

g System function of state variables **u**, see equation (2.2), page 12

u State variables that lead to algebraic equations, see equation (2.1), page 12

x State variables that lead to differential equations, see equation (2.1), page 12

Index

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