

abbreviations	
BEARN	Boucle en Eau à l'Ambiance des Réacteurs Nucléaires (water pressure loop in nuclear reactors ambience)
FBG	Fiber Bragg Grating
NPP	Nuclear Power Plant
NPS	Nominal Pipe Size
Sch.	Schedule
thermomechanical parameters	
λ, μ	Lamé's coefficients
E	Young's modulus
ν	Poisson's ratio
α	thermal expansion coefficient
a	thermal effusivity
k	thermal conductivity
ρ	volume mass
C_p	mass heat capacity
geometrical parameters	
r_{0int}	initial inner radius
r_{int}	current inner radius
r_{0ext}	initial outer radius
r_{ext}	current outer radius
R_{ref}	initial curvature radius
R	current curvature radius
displacement, strain and stress	
$\vec{u}(u, v, w)$	displacement vector \vec{u} expressed in the cylindrical (O, r, θ, z) coordinate system (figure 1)
\vec{u}_σ	mechanical displacement vector
\vec{u}_T	thermal displacement vector
ε_{mec}	mechanical strain
ε_{th}	thermal strain
σ	stress
boundary conditions and integration coefficients	
P_{0int}	initial inner hydrostatic pressure
P_{int}	current inner hydrostatic pressure
P_{0ext}	initial outer hydrostatic pressure
P_{ext}	current outer hydrostatic pressure
T_0	initial temperature
T	current temperature
\vec{F}	longitudinal force
$\delta \vec{F}$	unexplained longitudinal force variation
\vec{f}	volume forces (including <i>e.g.</i> : gravity)
$\vec{\gamma}$	volume forces of acceleration
$K_0, K_1, K_2, K_3, K_4, L_1 \text{ \& } L_2$	integration coefficients relative to the set of partial differential equations (12)
measurements	
Ψ	transducer raw measurement (<i>e.g.</i> : λ_B for the FBG transducer)
$\underline{\Delta\Psi}$	true relative variation of parameter Ψ between reference Ψ_0 & current $\Psi_1 = \Psi_0 + \Delta\Psi$ values $\underline{\Delta\Psi} = \ln\left(1 + \frac{\Delta\Psi}{\Psi_0}\right)$
$\Delta\Psi$	variation of parameter Ψ between reference Ψ_0 & current Ψ_1 values $\Delta\Psi = \Psi_1 - \Psi_0$
FBG transducer	
κ_T	transducer sensitivity to temperature
κ_ε	transducer sensitivity to longitudinal mechanical strain
n_{eff}	optical fiber waveguide effective refractive index
Λ	grating pitch
λ_B	Bragg wavelength