Nomenclature

Table of variables in Section 3

α	Biot constant
$\boldsymbol{\epsilon}$	total strain
$\boldsymbol{\epsilon}^c$	creep strain
$\boldsymbol{\epsilon}^p$	plastic strain
$\boldsymbol{\epsilon}^T$	thermal strain
ρ	fluid density
$\boldsymbol{\sigma}$	Cauchy (total) stress
$\tilde{\boldsymbol{\sigma}}$	effective stress
c_0	specific storage coefficient
$\mathbf{D}$	fourth-order elasticity tensor
$\mathbf{f}$	body force
$\mathbf{g}$	gravity vector
$\mathbf{I}$	second-order unity tensor
$\mathbf{K}$	rock permeability tensor divided by fluid viscosity
$\mathbf{n}$	outward unit normal vector
p	fluid pressure
q	source or sink term
$\mathbf{u}$	displacement vector
$\mathbf{z}$	Darcy velocity

Table of variables in Section 7.1

μ_α	viscosity of phase α
ξ_i^α	molar fraction of component i in phase α
ρ_α	density of phase α
ϕ	porosity at current configuration
ϕ_0	reference porosity
Φ_i^α	fugacity coefficient of component i in phase α
c_r	rock compressibility constant
f_i^α	fugacity of component i in phase α
$\mathbf{g}$	gravity vector
$k_{r\alpha}$	relative permeability of phase α
$\mathbf{K}$	absolute permeability tensor
n_c	number of hydrocarbon components
N_i	molar concentration of component i
p	reference phase pressure
p_0	reference pressure
p_α	pressure of phase α
$p_{c\alpha}$	capillary pressure of phase α
q_i	source or sink term for component i
S_α	saturation of phase α
T	reservoir temperature
$\mathbf{u}_\alpha$	Darcy velocity of phase α

Table of variables in Section 7.2

ϕ^*	effective porosity at current configuration
M	Biot's modulus
$\mathbf{u}_0$	initial displacement at reference pressure p_0

Table of variables in Section 7.3

α,γ,A,e,R	constants related to the shapes of the shear envelope and cap portion
$\tilde{\alpha}$	$[\Delta^*]_n/[\Delta]_n$
β	friction angle
Γ	cohesion
$[\Delta]_n$	normal displacement jump at which normal traction reaches maximum
$[\Delta]_t$	tangential displacement jump at which tangential traction reaches maximum
$[\Delta]^*$	$[\Delta^*]_n = [u]_n\vert_{t_n \to 0}$
$\boldsymbol{\epsilon}^p$	plastic strain
λ	nonnegative consistency parameter
$\boldsymbol{\sigma}$	Cauchy (total) stress
$\boldsymbol{\sigma}_0$	material shear-related strength
$\tilde{\boldsymbol{\sigma}}$	effective stress
$\boldsymbol{\tau}$	shear stress
Φ	interfacial potential
Ψ	ratio of tri-axial extension strength to compression strength
Ψ_n	$\Psi_n = e\sigma_{\max}[\Delta]_n$
Ψ_t	$\Psi_t = \sqrt{e/2}\tau_{\max}[\Delta]_t$
F	flow potential
H	Heaviside function
I_1	first invariant of effective stress tensor
II	fourth-order identity tensor
J_2	second invariant of effective stress tensor
J_3	third invariant of effective stress tensor
K_0	intersection coordinate of the shear and cap portions
$\mathbf{n}$	outward unit norm vector
q	Ψ_n/Ψ_t
$\mathbf{t}$	traction at prescribed boundary
t_n	normal traction
t_t	tangential traction
$[\mathbf{u}]$	displacement jump across interface
$[u]_n$	$[u]_n = [\mathbf{u}] \cdot \mathbf{n}$
$[u]_t$	$[u]_t = \|(II - \mathbf{n}\otimes\mathbf{n})[\mathbf{u}]\|_2$
x	$x = [u]_n/[\Delta]_n$
X_0	material compaction strength
y	$y = [u]_t/[\Delta]_t$
Y	material yielding function
Y_s	shear envelop yielding function