List of Symbols

Transport coefficients

η	shear viscosity
λ	thermal conductivity
η_V	bulk viscosity
ζ	Brownian friction coefficient
D	self diffusion coefficient

Thermodynamic fluxes

$\mathbf{P}$	the pressure tensor
$\mathbf{J}_Q$	heat flux
Π	viscous pressure tensor

Thermodynamic forces

$\nabla\mathbf{u}$	strain rate tensor
γ	shear rate $= \partial u_x / \partial y$
∇T	temperature gradient
$\nabla.\mathbf{u}$	dilation rate
$\mathbf{u}$	streaming velocity
ε	elastic deformation
$\nabla\varepsilon$	strain tensor
$\dot{\varepsilon}$	dilation rate $= \frac{1}{3}\ (\nabla.\dot{\varepsilon})$

Thermodynamic state variables

T	temperature
k_B	Boltzmann's Constant
β	$1/k_BT$
V	volume
p	hydrostatic pressure, $= \frac{1}{3}$ tr(P)
N	number of particles
ρ	mass density
n	number density

Thermodynamic constants

G	shear modulus
C_V	constant volume specific heat
C_p	constant pressure, specific heat
c_V	constant volume,specific heat per unit mass
c_p	constant pressure,specific heat per unit mass
D_T	isochoric thermal diffusivity

Thermodynamic potentials

E	internal energy
$U(\mathbf{r},t)$	internal energy per unit mass
S	entropy
$s(\mathbf{r},t)$	internal energy per unit volume
σ	entropy source strength = rate of spontaneous entropy production per unit volume
I	enthalpy
Q	heat

Mechanics

L	Lagrangian
H	Hamiltonian
H_0	phase variable whose average is the internal energy
I_0	phase variable whose average is the enthalpy
$J(\Gamma)$	dissipative flux
F_e	external field
α	thermostatting multiplier
iL	p-Liouvillean
iL	f-Liouvillean
$A^\dagger$	Hermitian adjoint of A
Λ	phase space compression factor
$\exp_R$	right time-ordered exponential
$\exp_L$	left time-ordered exponential
$U_R(t_1,t_2)$	incremental p propagator t_1 to t_2
$U_R(t_1,t_2)^{-1}$	inverse of $U_R(t_1,t_2)$, take phase variables from t_2 to t_1, $U_R(t_2,t_1) = U_L(t_1,t_2)$
$U_R(t_1,t_2)$	incremental f propagator t_1 to t_2

T_R	right time-ordering opertator
T_L	left time-ordering opertator
$C_{AB}(t)$	equilibrium time correlation function = $\langle A(t)B^* \rangle$
$[A,B]$	commutator bracket
$\{A,B\}$	Poisson bracket
$\delta(t)$	Dirac delta function (of time)
$\delta(\mathbf{r}-\mathbf{r}_i)$	Kirkwood delta function
	$= 0$, $\lvert\mathbf{r}-\mathbf{r}_i\rvert >$ an *infinitesmal* macroscopic distance, l
	$= 1/l^3$, $\lvert\mathbf{r}-\mathbf{r}_i\rvert <$ an *infinitesmal* macroscopic distance, l
$f(\mathbf{k}) = \int d\mathbf{r} e^{i\mathbf{k}\cdot\mathbf{r}} f(\mathbf{r})$	spatial Fourier transform
$f(\omega) = \int_0^\infty d\mathbf{r} e^{-i\omega t} f(t)$	temporal Fourier-Laplace transform∏
$\mathbf{dS}$	infinitesmal vector area element
$\mathbf{J}^\perp$	transverse momentum current
Φ	total intermolecular potential energy
ϕ_{ij}	potential energy of particle i, j
K	total kinetic energy
f_c	canonical distribution function
f_T	isokinetic distribution function
m	particle mass
$\mathbf{r}_i$	position of particle i
$\mathbf{r}_{ij} = \mathbf{r}_j - \mathbf{r}_i$	
$\mathbf{v}_i$	velocity of particle i