Errata for the first (October 2005) printing of
“Lattice Boltzmann Modeling” by Sukop and Thorne

19 September 2007

P 25: In Exercise 2, the fhp_simp4.c file must be renamed as fhp_simp.c prior to
compilation. The fhp6_simp.c in the Lgapack distribution has 4-particle collisions and
has a viscosity that does not follow Equation (8).

P 38:
The following lines
uxuy5 = uxij + uyi;
uxuy6 = -uxij + uyi;
uxuy7 = -uxij + -uyij;
uxuy8 = uxij + -uyij;

should be
uxuy5 = uxeqij + uyeqij;
uxuy6 = -uxeqij + uyeqij;
uxuy7 = -uxeqij + -uyeqij;
uxuy8 = uxeqij + -uyeqij;

The next-to-last line of the code snippet should be
fij[a] = ftempij[a] - ( ftempij[a] - feqij[a]/tau;

P 47: In Equation (30), 1/8 $\rho$ should be 1/9 $\rho$ in the two places it appears.

P 48: In Equation (32), the last 2 lines should have $f_6$ instead of $f_5$ as in:
$$
\rho v_0 = \frac{2}{3} \rho v_0 + 2f_6 - 2f_8 - (f_1 - f_3) \Rightarrow
f_8 = f_6 - \frac{1}{2} (f_1 - f_3) - \frac{1}{6} \rho v_0.
$$

P 49: In the code snippet for velocity boundary conditions, both the east and west side
BCs include:
rho0 = f[j[0] + f[j[1] + f[j[3]]

They should be
rho0 = f[j[0] + f[j[2] + f[j[4]]
P 49 to 52: The section on "Dirichlet (Pressure) Boundaries" cites the wrong equation numbers in the text body; the equations themselves are numbered properly. Here is a list of mappings where (N) → (N') means that the currently stated equation number (N) should instead be (N'):

(20) → (33)
(23) → (36)
(22) → (35)
(29) → (49)
(30) → (42)

P 52:
Equation (42) should have $\rho_0v$ instead of $\rho v_0$.

In Equation (44), the last 2 lines should have $f_6$ instead of $f_5$ as in:

$$
\rho_0v = \frac{2}{3}\rho_0v + 2f_6 - 2f_8 - (f_5 - f_3) \Rightarrow \\
f_8 = f_6 - \frac{1}{2}(f_5 - f_3) - \frac{1}{6}\rho_0v.
$$

The words 'velocity' and 'density' should be exchanged and the 'e.g., equation (19)' should be eliminated in the last paragraph. The first sentence of the summary paragraph should read:

"To summarize the procedure, we specify a density $\rho_0$ at the boundary and solve for the macroscopic velocity normal to the boundary and the three unknown directional densities via four equations."

P. 53:

South BC should be:
$$uy_0 = + 1 \cdot \ldots \\
fj[6] = fj[8] + \ldots 
$$

West BC should be:
$$ux_0 = + 1 \cdot \ldots 
$$

P 105: Equation (95) should have $\rho_0$ in the denominator instead of $f_a \sigma$.

P 115: $du/dt$ should be $du/dx$

P 141: On the top line, the figure reference should be to Figure 73.

P 150: The inline formula should be $K = kg/\nu$ instead of $k = Kg/\nu$. 