APPENDIX I

PSEUDO CODE FOR PARTICLE SWARM OPTIMIZATION ALGORITHM

Step 1  Objective function $f(x)$, $x = (x_1, \ldots, x_d)^T$

Step 2  Initialize locations $x_i$ and velocity $v_i$ of $n$ particles.

Step 3  Find $g^*$ from $\min \{f(x_1), \ldots, f(x_n)\}$ (at $t = 0$)

Step 4  While (criterion)

for loop over all $n$ particles and all $d$ dimensions

Generate new velocity $v_i^{t+1}$ using equation

$$v_{i,m}^{t+1} = W v_{i,m}^t + C_1 \cdot \text{rand} \cdot (P_{\text{best},m} - X_{i,m}^t) + C_2 \cdot \text{rand} \cdot (G_{\text{best},m} - X_{i,m}^t)$$

Calculate new locations $x_i^{t+1} = x_i^t + v_i^{t+1}$

Evaluate objective functions at new locations $x_i^{t+1}$

Find the current best for each particle $x_i^*$

end for

Find the current global best $g^*$

Update $t = t + 1$ (pseudo time or iteration counter)

end while

Step 5  Output the final results $x_i^*$ and $g^*$