**Table S.2. Drag models used in the performance comparison with the GP-based model**

|  |  |  |
| --- | --- | --- |
| No. | Drag model by | Drag model |
| 1 | Wen and Yu (1966) | *for* |
| 2 | Gidaspow and Ettihadieh (1983) | Where is given as (Rowe,[51]) |
| 3 | Gibilaro (2001) |  |
| 4 | Syamlal and O’Brien (1988) | Where is given as (Dalla Valle, [52]):  Where vr is given as (Garside and Al- Dibouni, [53])  vr =  A =  B = |