which corresponds exactly to the relation of Wen and Yu (1966). In the above formula, $(C_{D,s})U_{sg}$ is the drag coefficient of particles in an infinite fluid based on the superficial velocity of fluid (U_{sg}). This equation can be rewritten

$$\frac{3}{4}\frac{C_D}{(1-E_p)^2}\frac{Re_p^2}{Ar} = 1, \qquad (8)$$

where C_D is the drag coefficient based on the actual intersticial velocity. Combining equations (5) and (8) the relation between the coefficient f_E and the drag coefficient C_D is obtained

$$f_E = \frac{3}{4} C_D (1 - E_p) \qquad (9)$$

Introducing the above equation into equation (3) the following correlation between f_{tp} and α for a fluidized bed is obtained

$$f_{tp} = \left[\frac{3}{8(1-E_p)}\right]\alpha \qquad (10)$$

It is seen that in the case of a fluidized bed there is also a factor being a recipro-cal of bed porosity. Assuming that for a packed bed at the point of incipient fluidization the porosity is equal to 0.441 we obtain the same value of coefficient as in equation (1).

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NOTATION

- Ar = Archimedes number, $g\, d_p^3\, (\rho_p - \rho_f)\, \rho_f / \mu_f^2$
- C_D = drag coefficient in a suspension
- $C_{D,s}$ = drag coefficient of a single particle in an infinite medium
- d_p = particle diameter
- D = tube diameter
- E_p = particle holdup
- f_{tp} = two-phase friction factor, $f_{tp} = \dfrac{\Delta P_f D}{2\, \rho_g U_{sg}^2 L}$
- g = acceleration due to gravity
- L = bed length
- Re_p = Reynolds number, $(U_{sg} d_p \rho_g / \mu_g)$
- ΔP_f = pressure drop
- U_{sg} = superficial fluid velocity

Greek Letters

- α = dimensionless parameter, $(C_D E_p D / [(1 - E_p) d_p])$
- μ_g = gas viscosity
- ρ_g = gas density
- ρ_p = particle density

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ERRATA

In "Characterization and Analysis of Continuous Recycle Systems: Part I. Single Unit" by Mann, et al. [*AIChE J.* **25**, 873 (1979)], a few equations were printed with errors. Some of the errors were pointed out by Zuang-Cong Lu of the Research Institute of Chemical Engineering in Shanghai, China. The corrections are as follows:

1. The term q(j) instead of q(n) should appear in the summation of Eq. 15.
2. The last line of Eq. 23 should be deleted.
3. It should be pointed out that the density functions of the RTD, f(t), for all the four cases discussed (Eqs. 26, 32, 38 and 43) are defined for $t - n\tau_1 - (n-1)\tau_2 \geq 0$ and are equal to zero otherwise.
4. The last line of Eq. 38 should be

$$\left(\frac{t - n\tau_1 - (n-1)\tau_2}{\beta_2}\right)^{(n-1)\alpha_2 - 1} \cdot e^{-(t - n\tau_1 - (n-1)\tau_2)/\beta_2}$$

5. In Eq. 43, the limits of the integral and the upper limit of the summation are incorrect. Also, the equation begins on page 879 and ends on page 878. The complete equation is as follows:

$$\begin{aligned} f(t) &= (1-p)\frac{1}{\Gamma(\alpha_1)}\frac{1}{\beta_1}\left(\frac{t-\tau_1}{\beta_1}\right)^{\alpha_1 - 1} \cdot e^{-(t-\tau_1)/\beta_1} \\ &+ (1-p)\sum_{n=2}^{(t+\tau_2)/(\tau_2+\tau_2)} p^{n-1}\frac{1}{\Gamma(n\alpha_1)}\frac{1}{\Gamma((n-1)\alpha_2)}\frac{1}{\beta_1}\frac{1}{\beta_2}\cdot \\ &\cdot \int_{n\tau_1}^{t-(n-1)\tau_2}\left(\frac{x - n\tau_1}{\beta_1}\right)^{n\alpha_1 - 1} \\ &\times e^{-(x-n\tau_1)/\beta_1}\left(\frac{t-(n-1)\tau_2 - x}{\beta_2}\right)^{(n-1)\alpha_2 - 1} \\ &\cdot e^{-(t-(n-1)\tau_2 - x)/\beta_2}\, dx \end{aligned}$$

6. Eq. 62 should be

$$E[N,T] = -\frac{d}{ds}\frac{d}{dz}\hat{G}(z,s)\Big|_{\substack{s=0\\z=1}}$$

Uzi Mann and Michael Rubinovitch
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