From eq 1, $Pu = \mathbf{C}RT$; hence

$$\lambda = \frac{P\varphi\sum xC_x}{\mathbf{C}} = P\varphi Zn \tag{22a}$$

or

$$Zn = \frac{\lambda}{P\varphi} \tag{22b}$$

for the discontinuous case. This result is analogous to that in the continuous case where

$$Zn = L/JP\varphi \tag{22c}$$

From eq 15 and 22b one can see that when (and if) $Zn = Zw$, then $\lambda = P/v$; but there is no necessity for this to occur at the pressure corresponding to the minimum in Zn. In Table II we have summarized the relevant equations for the continuous and discontinuous cases.

It can be seen by examining Table II that the definition of Zn has not changed in going from the continuous case to the discontinuous case, but that the definition of Zw has changed due to the appearance of the new variable λ. The problem now has become the evaluation of the constants of integration. As yet this is not possible in all cases.

Table II: Summary of Equations for the Degree of Aggregation, Zn and Zw for the Continuous and Discontinuous Cases[a]

Continuous case	Discontinuous case
$Zn = \dfrac{L}{Jp\varphi}$	$Zn = \dfrac{\lambda}{P\varphi} = \dfrac{L_v}{J_vP\varphi}$
$= \dfrac{1}{APve^{v/J}}$	$= \dfrac{1}{A'Pve^{v/J}}$
$= \dfrac{RTw/M^0}{EPve^{v/J}}$	$= \dfrac{RTw/M^0}{E'Pve^{v/J}}$
$Zw = 1/v\varphi$	$Zw = 1/v\varphi$
$= \dfrac{J}{ALv^2e^{v/J}}$	$= \dfrac{1}{A'\lambda Pv^2e^{v/J}}$
$= \dfrac{JRTw/M^0}{ELv^2e^{v/J}}$	$= \dfrac{RTw/M^0}{E'\lambda v^2e^{v/J}}$
$\varphi = -\left(\dfrac{\mathrm{d}\ln C_1}{\mathrm{d}v}\right)$	$\varphi = -\left(\dfrac{\partial \ln C_1}{\partial v}\right)_\alpha$
$= (AvLe^{v/J})/J$	$= A'\lambda ve^{v/J}$

[a] The constant A is different for the continuous and discontinuous cases. J and L are experimental and independent of which case is chosen for analysis. [c] $\lambda = L_v/J_v$ and it is a variable with pressure.

Further work is in progress on the mathematical and conceptual development of this theory.