Method for calculating the critical amplitude of the coexistence curve

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Based on experimental information on the density of saturated vapor and saturated liquid in the vicinity of the critical point, the critical amplitude B_0 was calculated for different values of the critical index β of the coexistence curve and the correlation dependence $B_0 = B_0(\beta, \omega)$ was determined, where ω is the acentric factor of the substance. The correlation $B_0 = B_0(\beta, \omega)$ was tested on the basis of 24 substances for which the literature provides data on $B_0 = B_{0,exp}$ at $0.315 \leq \beta \leq 0.385$ and $0 \leq \omega \leq 3.65$. The deviations of the $B_{0,exp}$ values from those calculated by the correlation $B_0(\beta, \omega) = c_1 + c_2\omega + c_3\beta + c_4\omega^3$ for all the substances considered do not exceed 7% in absolute value ($c_1 = -2.47368$, $c_2 = 1.36533$, $c_3 = 12.06886$, $c_4 = -1.23152$). The hypothesis that the amplitude B_0 depends only on the critical index β, $B_0 = B_0(\beta)$, is discussed. It is established that the dependence $B_0 = B_0(\beta)$ proposed in [**?**] leads to significant, up to 37%, deviations of the calculated values of B_0 from the values of $B_{0,exp}$. It is shown that the correlations and $B_0 = B_0(\omega)$ [**?**] agree with each other at values $0.323 < \beta < 0.328$, however, in the case of $B_0 = B_0(\omega)$ [**?**], the discrepancies in the values of $B_0 = B_0(\omega)$ and $B_{0,exp}$ for all 24 substances exceed 10%. The position that the critical amplitude of the coexistence curve is an individual characteristic of a substance, which depends on the degree of non-sphericity of the substance molecules and the compressibility factor, Z_c, is discussed.