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Erratum

Anomalous diffusion in random media of any dimensionality

J. P. Bouchaud, A. Comtet, A. Georges and P. Le Doussal

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We have found some mistakes in the published version of our paper quoted above :

(i) In the long-range correlated case $a < D$, the β -functions should read ($\varepsilon = 2 - a$) :

$$\begin{aligned}\beta_T &= -\varepsilon g_T + 8 C_D \left(1 - \frac{1}{D}\right) g_T^2 + \dots \\ \beta_L &= -\varepsilon g_L + 8 C_D \left(1 - \frac{1}{D}\right) g_L g_T + \dots\end{aligned}$$

instead of equation (9), which holds for short-range correlations (with $\varepsilon = 2 - D$, $C_D = \frac{1}{2\pi}$). This, however, does not modify the diffusion behaviours of table I, except for model I, where it becomes :

$$\begin{aligned}\text{for } a = 2 : t (\ln t)^{\frac{1}{2} \frac{D-2}{D-1}} &\text{ instead of } t (\ln t)^{\frac{D-2}{D-1}} \\ \text{for } a < 2 : t^{1 + \frac{D-2}{D-1} \frac{\varepsilon}{4}} &\text{ instead of } t^{1 + \frac{D-2}{D-1} \frac{\varepsilon}{2}}.\end{aligned}$$

For a general situation however, with an arbitrary ratio g_T/g_L , the structure of the RG flow is modified (in the long-ranged case), resulting (at one loop order) in a diffusion exponent depending continuously on this ratio.

(ii) In the potential case (model III), since we have shown that the corrections to the β -function vanish at all orders, the result given in table I in the marginal case $a = 2$ can in fact be generalized at arbitrary disorder under the following form (apart from possible non-perturbative effects) :

$$\overline{X^2(t)} \sim t^{2\nu} \quad \text{with} \quad 2\nu = \left[1 + 2 \frac{C_D}{D} \sigma\right]^{-1}$$

ν thus depends continuously on the strength of the disorder σ , defined by : $G_L(k) \sim 4 \sigma k^{a-D}$ where G_L is defined by equations (2, 3).