

Correction to ‘Statistical mechanics of nonlinear  
elasticity’ (Markov Processes and Related Fields  
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In Theorem 1 part (ii) it is stated that  $f(\alpha\mathbf{a}, \beta\mathbf{b})$  is a convex function of the positive real numbers  $\alpha, \beta$ . I believe this to be true, but the proof given is erroneous; when corrected, it shows only that  $f(\alpha\mathbf{a}, \beta\mathbf{b})$  is convex in either one of the variables  $\alpha, \beta$  when the other is held constant, but not in both variables together. (For example the function  $\alpha^2 - 3\alpha\beta + \beta^2$  is convex in  $\alpha$  and  $\beta$  separately, but not in both together.)

In the proof given for Theorem 1, eqn (5.6) should read

$$\begin{aligned} \frac{\log Z_{el}(\mathbf{a}, \mathbf{b}; 2^{k+1}, 2^{k+1})}{4^{k+1}} &\geq \frac{1}{4} \left( \frac{\log Z_{el}(\mathbf{a}', \mathbf{b}'; 2^k, 2^k)}{4^k} + \frac{\log Z_{el}(\mathbf{a}', \mathbf{b}''; 2^k, 2^k)}{4^k} + \right. \\ &\quad \left. + \frac{\log Z_{el}(\mathbf{a}'', \mathbf{b}'; 2^k, 2^k)}{4^k} + \frac{\log Z_{el}(\mathbf{a}'', \mathbf{b}''; 2^k, 2^k)}{4^k} \right) \end{aligned}$$

and eqn (5.7) should read

$$f_{el} \left( \frac{1}{2}[\mathbf{a}' + \mathbf{a}''], \frac{1}{2}[\mathbf{b}' + \mathbf{b}''] \right) \leq \frac{1}{4} [f_{el}(\mathbf{a}', \mathbf{b}') + f_{el}(\mathbf{a}', \mathbf{b}'') + f_{el}(\mathbf{a}'', \mathbf{b}') + f_{el}(\mathbf{a}'', \mathbf{b}'')]$$

in which  $\mathbf{a}'$  must be parallel to  $\mathbf{a}''$  and  $\mathbf{b}'$  parallel to  $\mathbf{b}''$ . By setting  $\mathbf{b}'' = \mathbf{b}'$  we see that  $f$  is convex in  $\alpha$  at fixed  $\beta$ , and similarly it is convex in  $\beta$  at fixed  $\alpha$ ; but the corrected formula (5.7) does not show that  $f$  is convex in both variables together.