Reply to "Comment on 'Theory of high-force DNA stretching and overstretching'"
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Reply to “Comment on ‘Theory of high-force DNA stretching and overstretching’”

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In his Comment to an earlier paper [Phys. Rev. E 67, 051906 (2003)] Lam points out an error in Eq. (20) of the original paper. Here we show that use of the corrected expression produces results very similar to those presented in our original paper, so our qualitative conclusions are unchanged.

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As Lam points out in the preceding Comment [1], there is an error in Eq. (20) of our paper [2]. Instead of

\[
y(\omega) = \frac{2 \sqrt{2} \pi^3 \omega^2 e^{-2\tilde{\ell}} (2\omega + \tilde{f})^2}{\sqrt{-\tilde{\ell}} (2\omega + \tilde{f})} \text{csch}(2\omega) \\
\times \left[ \text{erf} \left( \frac{i}{2 \sqrt{2} \tilde{\ell}} (\tilde{f} + 4\tilde{\ell} + 2\omega) \right) \\
- \text{erf} \left( \frac{i}{2 \sqrt{2} \tilde{\ell}} (\tilde{f} - 4\tilde{\ell} + 2\omega) \right) \right],
\]

it should, in fact, read

\[
y(\omega) = \frac{2 \sqrt{2} \pi^3 \omega^2 e^{-2\tilde{\ell}} (2\omega + \tilde{f})^2}{\sqrt{-\tilde{\ell}} (2\omega + \tilde{f})} \text{csch}(2\omega) \\
\times \left[ \text{erf} \left( \frac{i}{2 \sqrt{2} \tilde{\ell}} [4\tilde{\ell} + (\tilde{f} + 2\omega)] \right) \\
- \text{erf} \left( \frac{i}{2 \sqrt{2} \tilde{\ell}} [4\tilde{\ell} - (\tilde{f} + 2\omega)] \right) \\
- 2 \text{erf} \left( \frac{i}{2 \sqrt{2} \tilde{\ell}} (\tilde{f} + 2\omega) \right) \right].
\]

FIG. 1. Fit of the extensible DPC model (solid line) to the single-strand DNA stretching data (dots) supplied by Rief; see Ref. [3]. The fit shown was obtained for \( b=0.21 \text{ nm}, E=2.8 \times 10^3 \text{ pN}, L_{\text{ref}}=3.7 \text{ \mu m}, \text{ and } \kappa_{\text{DPC}}=3/2(k_B T/0.71 \text{ nm}). \) In addition, the dashed and long-dashed lines show the corresponding best fits to the extensible WLC and FJC, respectively. All fits include the data points only for forces between 20 pN and 250 pN. Values for \( \chi^2 \) were EFJC, \( \chi^2=0.20; \) EWLC, \( \chi^2=0.13; \) and EDPC, \( \chi^2=0.12 \) at \( N=1271. \) We ignore the lowest-force points because of complications induced by hairpins and other secondary structures in the DNA.

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We conclude by expressing our gratitude to Dr. Lam for bringing to light this unfortunate error.