Waves with Power-Law Attenuation: Corrections

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These are corrections and additions for Holm (2019). Bold text needs to be added and replace stricken-out text. Please send new suggestions to email: sverre (a) ifi.uio.no.

1 Introduction

- Page 12, Fig 1.4: New figure and additions to caption (no effect on main text)
- Page 12, misprint: replace \( d^{-t/\tau} \) by \( e^{-t/\tau} \) in:

\[
G(t) = E_e + E_e \left( \frac{\tau_e}{\tau} - 1 \right) e^{-t/\tau},
\]

(1.14)

3 Models of linear viscoelasticity

- Page 79, Fig 3.7: \( \tau_\sigma \) in formula in upper figure should be \( \tau \)

5 Power-law wave equations from constitutive equations

- Page 126, Fig 5.4: New figure and additions to caption (no effect on main text)
- Page 133, Sect. 5.3.1: Missing minus after last equal sign:

\[
\Delta c_{ph} \approx \frac{c_0}{2} r^{y-1} \sin \frac{\pi y}{2} \omega^{y-1} = -c_0 \gamma_0 \tan \frac{\pi y}{2} \omega^{y-1}
\]

(5.35)

6 Phenomenological power-law wave equations

- Page 166, line 1, Sect. 6.1.2.1:

“... the phase velocity increases as a function of frequency, but then may start falling and eventually become negative zero.”
\[ \sigma(t) \]

\[ G_g = E_e \frac{\tau_e}{\tau_\sigma} \]

\[ G_e = E_e \]

\[ t \]

Fig. 1.4 Relaxation moduli of Zener model with an exponential time response, (1.13) (solid line) with \( E = 1, \eta = 0.5, \) and \( \tau_e = 1, \) and for the fractional Zener model (dashed line) for \( \alpha = 0.5, \tau_e = 2, \) which asymptotically approaches a power law function, (1.30). The asymptotic values are the glass modulus, \( G_g = G(0^+) \) and the equilibrium modulus, \( G_e \) for infinite time.

\[ \sigma(t) \]

\[ G(t) = E + \eta \frac{t^{-\alpha}}{\Gamma(1-\alpha)} \]

\[ t \]

Fig. 5.4 Relaxation moduli of fractional Kelvin-Voigt model (upper) with \( E = 1, \eta = 1 \) and fractional Zener model (lower) with \( \alpha = 0.5, \tau_e = 4 \)

7 **Justification for power laws and fractional models**

- Page 216, misprint in fourth line below Eq. (7.105): change (5.2.2) to (5.22): “just like the half-order fractional Newton model of (5.22)”

- Page 201, change text under Eq. (7.59): where the order may be in resulting in \( \tilde{E}(\omega) \approx E_0^{1-\alpha}(\omega \eta_0)^\alpha \) which extends (7.51) to the range \( 0 \leq \alpha \leq 1. \)

8 **Power laws and porous media**

- Page 256, Sect. 8.6: The reference of the final bullet point has now been published as Chandrasekaran & Holm (2019).
References
