Erratum

Resonantly damped oscillations of longitudinally stratified coronal loops

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The following corrections should be introduced in the paper:

1. In Sect. 6.1, the third paragraph up to Eq. (71) has to be: “Now we are in a position to prove the a priori assumption made in Sect. 3 that \( \Lambda_1^2 > 0 \). We will prove that the fundamental mode of the magnetic tube oscillations is non-leaky. When the equilibrium is symmetric with respect to the apex point, i.e. \( \rho_i(-z) = \rho_i(z) \), the first overtone is also non-leaky. Let us consider the fundamental mode of tube oscillations and take \( \omega_r = \omega_{01} \) in Eq. (24). Since \( \omega_{01}^2 \) is an eigenvalue of the Sturm-Liouville problem (12) with the corresponding eigenfunction \( q_{W_1} \) when \( r = r_c \), we can use Eq. (12) to express \( \omega_{01}^2 \) in terms of \( W_1 \).”

2. The quantities \( W_1 \) and \( \omega_{01} \) have to be substituted for \( W_n \) and \( \omega_{0n} \) respectively in Eqs. (71)–(73) and in the text in between these equations.

3. The text starting after Eq. (73) and up to the end of Sect. 6.1 has to be: “In accordance with the general theory of the Sturm-Liouville problem both \( W_1 \) and \( G_1 \) have simple zeros at \( z = \pm L \) and do not have zeros in the interval \((-L, L)\). This implies that the function \( G_1/W_1 \) is regular in \([-L, L]\). Since \( \chi < f_c \), this equation implies that \( \Lambda_1^2 > 0 \), i.e. the fundamental mode is non-leaky.

When the equilibrium is symmetric with respect to the apex point, \( \rho_i(-z) = \rho_i(z) \), \( W_0(z) \) is even for odd \( n \) and the same is true for \( G_n(z) \). This implies that, for the first overtone, the expansion (25) contains only terms with even numbers. Therefore the first overtone is non-leaky if \( \Lambda_2^2 > 0 \). In the same way as in the case of the fundamental mode we obtain Eq. (73) however with \( W_2 \), \( G_2 \) and \( \Lambda_2 \) substituted for \( W_1 \), \( G_1 \) and \( \Lambda_1 \). Function \( W_2(z) \) has a simple zero at \( z = 0 \). Since \( G_2 \) is an odd function, \( G_2(0) = 0 \) and \( G_2/W_2 \) is a regular function in \([-L, L]\). Hence, the obtained equation can be integrated form \(-L\) to \( L \). As a result we obtain Eq. (74) however with \( W_2 \), \( G_2 \) and \( \Lambda_2 \) substituted for \( W_1 \), \( G_1 \) and \( \Lambda_1 \). This equation shows that \( \Lambda_2^2 > 0 \), so that the first overtone is non-leaky.

As for higher overtones as well as the first overtone when the equilibrium is non-symmetric, it seems that they can be leaky even when \( \rho_i > \rho_e \) for any \( z \). However this problem needs further investigation.”

Integrating Eq. (73) from \(-L\) to \( L \) and using integration by parts we obtain

\[
\Lambda_1^2 \int_{-L}^{L} G_1^2 = \left( 1 - \frac{\chi}{f_c} \right) \int_{-L}^{L} \left( \frac{dG_1}{dz} \right)^2 dz + \frac{\chi}{f_c} \int_{-L}^{L} W_1 \left( \frac{d}{dz} \left( \frac{G_1}{W_1} \right) \right)^2 dz. \tag{74}
\]