rather than interpolating off the grid onto the cylinder, we have also verified that the error due to interpolation onto the cylinder is comparable to that produced by numerical integration[4]. Finally, all these small errors can be further reduced with the aid of a finer grid [3, 4].

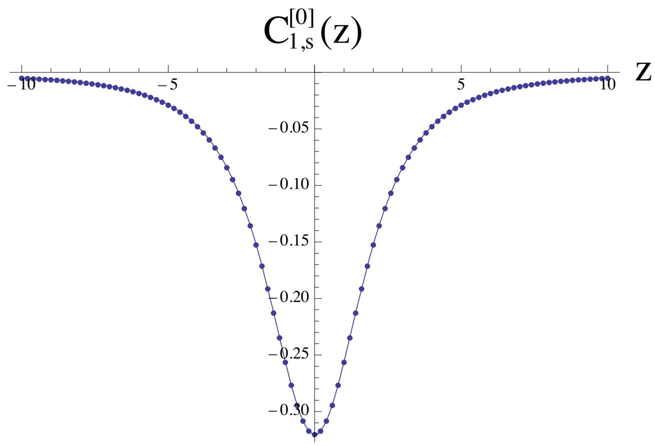

FIG. 11: Exact and numerical results for $C^{[0]}_{1,s}(z)$. Exact results are shown as a solid line, and numerical results are shown as dots.

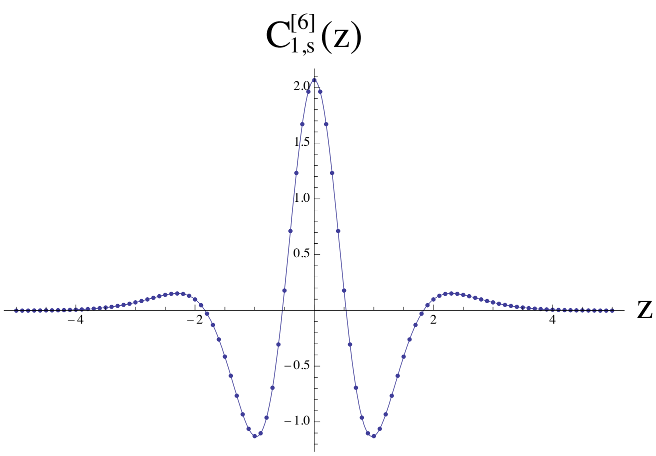

FIG. 12: Exact and numerical results for $C^{[6]}_{1,s}(z)$. Exact results are shown as a solid line, and numerical results are shown as dots.

C. Elliptical Cylinder Results

The procedure discussed in Section III B has been benchmarked using grid values identitical to those described in the previous section. Consider an elliptical cylinder of semiminor axis of $y_{\max} = 2$ cm and semimajor axis $x_{\max} = 4$ cm. In this case, we evaluate the angular integrals (49) using a Riemann sum with $N = 120$. (This is necessary to ensure sufficient convergence of the angular integrals to within 10^{-4}.) Doing so requires interpolation off the grid onto the elliptical cylinder at 120

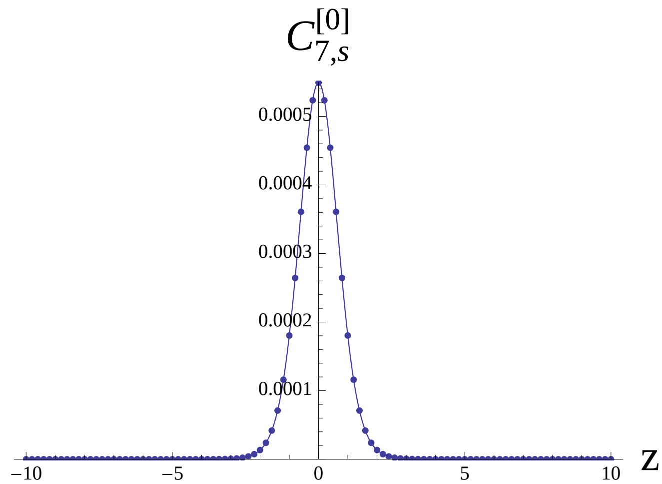

FIG. 13: Exact and numerical results for $C^{[0]}_{7,s}(z)$. Exact results are shown as a solid line, and numerical results are shown as dots.

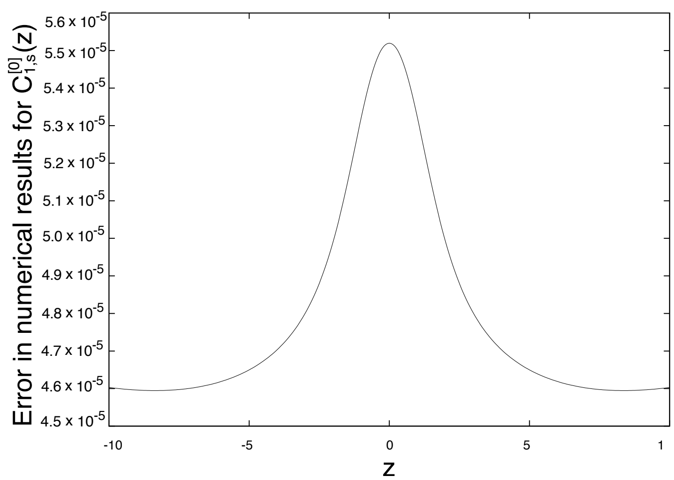

FIG. 14: Difference between exact and numerical results for $C^{[0]}_{1,s}(z)$.

angular points for each of the 4801 selected values of z. The sums in (55) are truncated beyond $r = r_{max}$, where r_{max} varies from 11 to 29 as necessary to achieve a tolerance of 1 part in 10^4. We evaluate the Fourier transform at 401 values of k in the range $[-K_c, K_c]$ with $K_c = 20$, using a spline-based Fourier transform algorithm. We use these same points in k space to evaluate the inverse Fourier transform, providing a set of numerically determined functions $C^{[n]}_{m,\alpha}(z)$.

Results for the functions $C^{[n]}_{m,\alpha}(z)$ are similar to those found in the circular cylinder case [3, 4], and have comparable accuracy. In the following section, however, we illustrate that functions obtained using an elliptical cylinder are significantly more robust against numerical noise in the original grid values.