Two semi-infinite, grounded, conducting planes lie parallel to the \(xz\) plane. They are separated in the \(y\) direction by a distance \(b\), and their edges lie against the plane \(x = 0\).

An infinitely long conducting strip with width \(b\) lies in the \(x = 0\) plane between the two grounded planes, and is held at a constant electric potential \(V\).

Solve Laplace’s Equation for the electric potential \(\phi(r)\) between the two grounded planes, for \(x \geq 0\), subject to the boundary conditions described above. Impose the further condition that \(\phi \to 0\) as \(x \to +\infty\). Your solution will be in terms of a Fourier series.

Demonstrate that the boundary condition at \(x = 0\) is satisfied by making a plot of your solution for \(\phi/V\) as a function of \(y\) at \(x = 0\). Do this by showing what the result looks like for the sum of the first several nonzero terms of the Fourier series.