

The original classroom resource requires the user to configure the quantum well (cell C8 and cells C13 to D22), then search for a change of sign by varying the value of cell G10 (this cell contains the value of epsilon). To speed up this process a small macro has been written. The macro automatically varies the value of cell G8 by using user-specified values. Three values are required: the initial value of epsilon, the final value of epsilon, and the increment size. These values are specified in cells C45 to C47 respectively. Upon execution the macro produces three sets of values, commencing in cells A50 to C50. To improve efficiency, an additional copy of the macro may also be run from cells G45 to G47. Furthermore, each macro has been assigned a keyboard shortcut (CTRL+Z and CTRL+X respectively). These additional features enable the user to quickly reduce the size of the interval containing a change of sign.

Modifying the classroom resource to incorporate position-dependent mass was a relatively straight-forward task. Specifically, the three cases listed in the Mathematics Today appendix were implemented by altering cells K33 to N43 and cells P34 to S42. Furthermore, m_i needs to be defined for each step and this additional user input is entered in cells K16 to K25. We note that setting $m_i = 1$ for $i = 1, 2, \dots, 6$ provides a useful check since these values result in the same energy eigenvalues as those listed in Reed's paper.