Review on “Generalized analytical solution for advection-dispersion equation in finite spatial domain with arbitrary time-dependent inlet boundary condition” by Chen J.-S. and C.-W. Liu

General comments

This paper develops a mathematical model for describing solute transport in a finite domain aquifer with an inlet boundary represented by an arbitrary time-dependent function. The model is based on one-dimensional advective-dispersive equation with considering the linear adsorption and first order decay mechanisms. A generalized solution of the model is derived by means of Laplace transform and generalized integral transform. In addition, the solutions of three special cases including constant, exponentially decaying and sinusoidally periodic input functions are also presented. This manuscript is well organized and clearly written. Those three special cases should be potentially useful to real-world problems. I therefore recommend its acceptance after minor revision.

Specific comments

1. The domain length of 1 m given in Table may be too small. For real-world contamination problems, the dimensions of contamination plumes reported in Bedient et al. (1999) are good references. For examples, the spill of aviation gas and jet fuel at the U.S. Coast Guard Station at Traverse City, Michigan was more than 1 mile long (Bedient et al. 1999, p.83) and the length of the groundwater plume from typical underground storage tanks was between 101 ft and 130 ft for California and between 190 ft and 260 ft for Texas (Bedient et al. 1999, p.84). Moreover, the Cape Canaveral site in Florida exhibited a TCE plume approximately 1200 ft long (Bedient et al. 1999, p.265).
2. It may be of readers’ interest to see one of the derivations for the solutions of those three time-dependent input functions. Such a derivation may be given either in the text or in the abstract.

Some remarks

1. Page 4101, line 28: “spatial domain” may read “spatial domains”.
2. Page 4103, line 15” “ $x_D = \frac{x}{L}$ ” should type “ $x_D = x / L$ ”. The same corrections should be made for similar problems throughout the text.

3. Page 4108, line 22: please check figure number for “Figure 2”.
4. Page 4108, line 25: “numerical solutions” may read “numerical solution”.
5. Page 4109, line 17: “Gaussian integration procedure” may be replaced by “Gaussian quadratures”. (Press et al. 1992)
6. Page 4109, line 23: “Figsures” should read “Figures”.
7. Page 4109, line 24: please add “,respectively” after “input functions”.

References

Bedient, P. B., Rifai, H. S., and Newell, C. J., Ground Water Contaminant, 2nd ed., PTR Prentice Hall, 1999.

Press, W. H., B. P. Flannery, S. A. Teukolsky, and W. T. Vetterling, *Numerical Recipes*, Second Ed., Cambridge University Press, Cambridge, 1992.