

Interactive comment on “Bilinear pressure diffusion and termination of bilinear flow in a vertically fractured well injecting at constant pressure” by Patricio-Ignacio Pérez D. et al.

Anonymous Referee #2

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This paper investigates the flow in a fracture from an injection well into a confined reservoir. The paper seeks for a numerical solution to be compared with an analytical solution already existed. To me the paper does not have a novelty and as written does not add additional value. The authors have previously published a similar paper on the subject: "Two-dimensional numerical investigations on the termination of bilinear flow in fractures" by Ortiz and Renner 2013.

Here are my comments:

1. The problem statement is very simplified and the analytical and numerical solutions already exist. references: 1. Cinco-Ley, H., & Samaniego-V., F. (1981, September

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1). Transient Pressure Analysis for Fractured Wells. Society of Petroleum Engineers. doi:10.2118/7490-PA. 2. Cinco-Ley, H., & Meng, H.-Z. (1988, January 1). Pressure Transient Analysis of Wells With Finite Conductivity Vertical Fractures in Double Porosity Reservoirs. Society of Petroleum Engineers. doi:10.2118/18172-MS. 3. Aguilera, R. (1989, January 1). Well Test Analysis of Dual-Porosity Systems, Intercepted by Hydraulic Vertical Fractures of Finite Conductivity. Society of Petroleum Engineers. doi:10.2118/18948-MS 4. Guppy, K. H., Cinco, H., & Ramey, H. J. (1981, January 1). Transient Flow Behavior Of A Vertically Fractured Well Producing At Constant Pressure. Society of Petroleum Engineers. doi:NA

2. Use of a reservoir simulator is recommended than COMSOL. Please check the literature on numerical solutions of reservoir simulations. Numerical solutions using reservoir simulations provide additional options necessary for this work: dual-porosity dual-permeability models. Authors might be able to use Comsol porous media flow module. However, there might be more updates in reservoir simulations packages. I checked the underlying equations and there is no porosity or indication of porous medium. A dual-porosity dual-permeability model must be used in this case. Similar research using this approach: Dejam, M., Hassanzadeh, H. and Chen, Z., 2018. Semi-analytical solution for pressure transient analysis of a hydraulically fractured vertical well in a bounded dual-porosity reservoir. Journal of hydrology, 565, pp.289-301.

3. The effect of boundary condition can be investigated by changing the boundary condition from close to open and even partially open boundary condition instead of changing the size of the domain. The effect of boundary condition must be investigated. The termination of bilinear flow and transition to boundary dominated flow is dictated by the boundary. It is recommended to change the boundary condition for a specific domain and analyze the results or investigate the effect of distance to a closed boundary on the results.