Erratum to: Parallel vertex approximate gradient discretization of hybrid dimensional Darcy flow and transport in discrete fracture networks

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The original version of this article unfortunately contained mistakes in few displayed and inline equations. The occurrences of “n” character were inadvertently deleted.

The corrected displayed and inline equations are presented below:

5th displayed equation, paragraph 10 under Discrete fracture network and functional setting

\[ W(\Omega, \Gamma) = \left\{ \left( q_m, q_f \right) \in H(\Omega, \Gamma) \mid \sum_{\alpha \in A} \int_{\Omega_{\alpha}}(q_m,\alpha \cdot \nabla v) + \sum_{i \in I} \int_{\Gamma_i} (q_{f,i} \cdot \nabla_{t_i} y_i v) + \left( \nabla_{t_i}(q_{f,i}) - \gamma_{n_{i}}^+ q_m - \gamma_{n_{i}}^- q_m \right) y_i v d\tau(x) = 0 \forall v \in V_0 \right\} . \] (1)

Equation 1

2nd, 3rd and 5th sentence, paragraph 11 under Discrete fracture network and functional setting

The last definition corresponds to imposing in a weak sense the conditions \( \sum_{i \in I} \gamma_n \Sigma_i q_{f,i} = 0 \) on \( \Sigma \setminus \Sigma_0 \) and \( \gamma_n \Sigma_i q_{f,i} = 0 \) on \( \Sigma_i \setminus \Sigma_{0,i} \) \( i \in I \), where \( \gamma_n \Sigma_i \) is the normal trace operator on \( \Sigma_i \) (tangent to \( \Gamma_i \)) with the normal oriented outward from \( \Gamma_i \), and using the extension of \( \gamma_n \Sigma_i q_{f,i} \) by zero on \( \Sigma \setminus \Sigma_i \).

Equation 2

\[ \begin{align*}
\text{div}(q_{m,a}) &= 0 \quad \text{on } \Omega_{\alpha}, \alpha \in A, \\
q_{m,a} &= -\frac{\Delta u}{\mu} \quad \text{on } \Omega_{\alpha}, \alpha \in A, \\
\text{div}_{t_i}(q_{f,i}) - \gamma_{n_{i}}^+ q_m - \gamma_{n_{i}}^- q_m &= 0 \quad \text{on } \Gamma_i, i \in I, \\
q_{f,i} &= -d_f \frac{\Delta u}{\mu} \nabla y_i u \quad \text{on } \Gamma_i, i \in I. 
\end{align*} \] (2)
Let $\gamma_m$ be the normal trace operator on $\partial \Omega$ with the normal oriented outward from $\Omega$. Let us define $\partial \Omega^- = \{ x \in \partial \Omega \mid \gamma_m q_m(x) < 0 \}$, $\Sigma^-_{i,0} = \{ x \in \Sigma_{i,0} \mid \gamma_m \Sigma_i q_{f,i}(x) < 0 \}$, $i \in I$, as well as the following subset of $\Sigma \setminus \Sigma_0$:

$$\Sigma^i = \left\{ x \in \Sigma \setminus \Sigma_0 \mid \sum_{i \in I} |\gamma_m \Sigma_i q_{f,i}(x)| \neq 0 \right\}.$$ 

Equation 4

$$\begin{align*}
\phi_m \partial_t c_m,\alpha + \text{div}(c_m,\alpha q_m,\alpha) &= 0 & \text{on } \Omega_\alpha \times (0, T), \alpha \in \mathcal{A}
\phi_f d_f \partial_t c_{f,i} + \text{div}_n (c_{f,i}(q_{f,i}) = \gamma_{n,i}^+ c_m q_m + \gamma_{n,i}^- c_m q_m & \text{on } \Gamma_{i} \times (0, T), i \in I,
(\gamma_{n,i}^+ c_m q_m)^- = c_f (\gamma_{n,i}^- q_m)^- & \text{on } \Gamma_{i} \times (0, T), i \in I,
(\gamma_{n,i}^+ c_{f,i}(q_{f,i})^- = c_f, (\gamma_{n,i}^- q_{f,i})^- & \text{on } (\Sigma_i \setminus \Sigma_{i,0}) \times (0, T), i \in I,
\sum_{j \in I} \gamma_{n,j} c_{f,i}(q_{f,i})^- = \bar{c}_{f,i} (\gamma_{n,j} q_{f,i})^- & \text{on } (\Sigma \setminus \Sigma_0) \times (0, T),
\gamma_{n} c_m q_m^- = \bar{c}_m (\gamma_n q_m)^- & \text{on } \partial \Omega \times (0, T),
\gamma_{n,i} c_{f,i}(q_{f,i})^- = \bar{c}_{f,i} (\gamma_{n,i} q_{f,i})^- & \text{on } (\Sigma_i \setminus \Sigma_{i,0}) \times (0, T), i \in I,
\gamma_{n} c_m q_m^- = \bar{c}_m (\gamma_n q_m)^- & \text{on } (\Omega \setminus \mathcal{T}) \times \{ t = 0 \},
c_m = c_0^m & \text{on } \Gamma \times \{ t = 0 \},
c_f = c_0^f & \text{on } \Gamma \times \{ t = 0 \},
\end{align*}$$