Comput Geosci (2017) 21:619–620
DOI 10.1007/s10596-017-9653-0

ERRATUM

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

Feng Xing[1,2] · **Roland Masson**[1] · **Simon Lopez**[2]

Published online: 6 June 2017

Erratum to: Comput Geosci DOI 10.1007/s10596-016-9606-z

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

$$\begin{aligned} H(\Omega,\Gamma) = \{ & \mathbf{q}_m = (\mathbf{q}_{m,\alpha})_{\alpha\in\mathcal{A}}, \mathbf{q}_f = (\mathbf{q}_{f,i})_{i\in I} \mid \\ & \mathbf{q}_m \in H_{\text{div}}(\Omega\setminus\overline{\Gamma}),\ \mathbf{q}_{f,i} \in L^2(\Gamma_i)^{d-1}, \\ & \text{div}_{\tau_i}(\mathbf{q}_{f,i}) - \gamma^+_{\mathbf{n},i}\mathbf{q}_m - \gamma^-_{\mathbf{n},i}\mathbf{q}_m \in L^2(\Gamma_i), i\in I\}, \end{aligned}$$

The online version of the original article can be found at http://dx.doi.org/10.1007/s10596-016-9606-z.

✉ Feng Xing
feng.xing@unice.fr

Roland Masson
roland.masson@unice.fr

Simon Lopez
s.lopez@brgm.fr

[1] Laboratoire de Mathématiques J.A. Dieudonné, UMR 7351 CNRS, University Nice Sophia Antipolis, team COFFEE, INRIA Sophia Antipolis Méditerranée, Parc Valrose 06108 Nice Cedex 02, France

[2] BRGM, Scientific and Technical Center, 3 Avenue Claude Guillemin, BP 36009, 45060 Orléans Cedex 2, France

Equation 1

$$\begin{aligned} W(\Omega,\Gamma) = \Bigg\{ & (\mathbf{q}_m,\mathbf{q}_f) \in H(\Omega,\Gamma) \mid \sum_{\alpha\in\mathcal{A}} \int_{\Omega_\alpha} (\mathbf{q}_{m,\alpha}\cdot\nabla v \\ & + \text{div}(\mathbf{q}_{m,\alpha})v)d\mathbf{x} + \sum_{i\in I}\int_{\Gamma_i} (\mathbf{q}_{f,i}\cdot\nabla_{\tau_i}\gamma_i v \\ & + (\text{div}_{\tau_i}(\mathbf{q}_{f,i}) - \gamma^+_{\mathbf{n},i}\mathbf{q}_m - \gamma^-_{\mathbf{n},i}\mathbf{q}_m)\gamma_i v)d\tau(\mathbf{x}) \\ & = 0\,\forall v\in V^0 \Bigg\}. \end{aligned} \quad (1)$$

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 $\sum_{i\in I}\gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i} = 0$ on $\Sigma\setminus\Sigma_0$ and $\gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i} = 0$ on $\Sigma_{i,N}$, $i\in I$, where $\gamma_{\mathbf{n},\Sigma_i}$ is the normal trace operator on Σ_i (tangent to Γ_i) with the normal oriented outward from Γ_i, and using the extension of $\gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i}$ by zero on $\Sigma\setminus\Sigma_i$.

Equation 2

$$\left\{\begin{aligned} \text{div}(\mathbf{q}_{m,\alpha}) &= 0 && \text{on } \Omega_\alpha, \alpha\in\mathcal{A}, \\ \mathbf{q}_{m,\alpha} &= -\tfrac{\Lambda_m}{\mu}\nabla u && \text{on } \Omega_\alpha, \alpha\in\mathcal{A}, \\ \text{div}_{\tau_i}(\mathbf{q}_{f,i}) - \gamma^+_{\mathbf{n},i}\mathbf{q}_m - \gamma^-_{\mathbf{n},i}\mathbf{q}_m &= 0 && \text{on } \Gamma_i, i\in I, \\ \mathbf{q}_{f,i} &= -d_f\tfrac{\Lambda_f}{\mu}\nabla_{\tau_i}\gamma_i u && \text{on } \Gamma_i, i\in I. \end{aligned}\right. \quad (2)$$

3rd sentence, paragraph 1 under Hybrid dimensional transport model

Let $\gamma_{\mathbf{n}}$ be the normal trace operator on $\partial\Omega$ with the normal oriented outward from Ω. Let us define $\partial\Omega^- = \{\mathbf{x} \in \partial\Omega \mid \gamma_{\mathbf{n}}\mathbf{q}_m(\mathbf{x}) < 0\}$, $\Sigma_{i,0}^- = \{\mathbf{x} \in \Sigma_{i,0} \mid \gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i}(\mathbf{x}) < 0\}$, $i \in I$, as well as the following subset of $\Sigma \setminus \Sigma_0$:

1st displayed equation, paragraph 1 under Hybrid dimensional transport model

$$\Sigma^- = \left\{\mathbf{x} \in \Sigma \setminus \Sigma_0 \mid \sum_{i \in I} |\gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i}(\mathbf{x})| \neq 0\right\}.$$

Equation 4

$$\left\{\begin{array}{rcll}
\phi_m \partial_t c_{m,\alpha} + \operatorname{div}(c_{m,\alpha}\mathbf{q}_{m,\alpha}) &=& 0 & \text{on } \Omega_\alpha \times (0,T), \alpha \in \mathcal{A} \\
\phi_f d_f \partial_t c_{f,i} + \operatorname{div}_{\tau_i}(c_{f,i}\mathbf{q}_{f,i}) &=& \gamma_{\mathbf{n},i}^+ c_m\mathbf{q}_m + \gamma_{\mathbf{n},i}^- c_m\mathbf{q}_m & \text{on } \Gamma_i \times (0,T), i \in I, \\
(\gamma_{\mathbf{n},i}^\pm c_m\mathbf{q}_m)^- &=& c_f(\gamma_{\mathbf{n},i}^\pm \mathbf{q}_m)^- & \text{on } \Gamma_i \times (0,T), i \in I, \\
(\gamma_{\mathbf{n},\Sigma_i} c_{f,i}\mathbf{q}_{f,i})^- &=& c_{f,\Sigma^-}(\gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i})^- & \text{on } (\Sigma_i \setminus \Sigma_{i,0}) \times (0,T), i \in I, \\
\sum_{j \in I} \gamma_{\mathbf{n},\Sigma_j} c_{f,j}\mathbf{q}_{f,j} &=& 0 & \text{on } (\Sigma \setminus \Sigma_0) \times (0,T), \\
(\gamma_{\mathbf{n}} c_m\mathbf{q}_m)^- &=& \bar{c}_m(\gamma_{\mathbf{n}} q_m)^- & \text{on } \partial\Omega \times (0,T), \\
(\gamma_{\mathbf{n},\Sigma_i} c_{f,i}\mathbf{q}_{f,i})^- &=& \bar{c}_{f,i}(\gamma_{\mathbf{n},\Sigma_i}\mathbf{q}_{f,i})^- & \text{on } \Sigma_{i,0} \times (0,T), i \in I, \\
c_m &=& c_m^0 & \text{on } (\Omega \setminus \overline{\Gamma}) \times \{t=0\}, \\
c_f &=& c_f^0 & \text{on } \Gamma \times \{t=0\},
\end{array}\right. \tag{4}$$