Erratum to: Fractures and vector valued maps

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The isoperimetric inequality of Proposition 3.1 from [1] is false, in general. In fact, its proof contains a mistake, as Eq. (3.4) is false. If e.g. $n = 2$, such an isoperimetric inequality is not satisfied if $u \in BV(\Omega, \mathbb{R}^2)$ is not a $W^{1,1}$ -function. Taking for example $\Omega = (-1, 1) \times (-1, 1)$ and $u(x_1, x_2) = (x_1, x_2)$ if $x_1 < 0$, whereas $u(x_1, x_2) = (x_1 + 1, x_2)$ if $x_1 > 0$, we have

$$(\partial G_u) \llcorner \Omega \times \mathbb{R}^2 = \gamma_1 \# I - \gamma_2 \# I, \quad I := \llbracket -1, 1 \rrbracket,$$

where $\gamma_1(\lambda) := (0, \lambda, 0, \lambda)$ and $\gamma_2(\lambda) := (0, \lambda, 1, \lambda)$, for $-1 < \lambda < 1$. This example also shows that Eq. (4.4) in Proposition 4.2 from [1] is false, in general, as we have

$$(\text{Det } \nabla u)^s = \frac{1}{2} \mathcal{H}^1 \llcorner J_u, \quad J_u = \{0\} \times (-1, 1).$$

As a consequence, it is not possible to deal with singular sets of any dimension lower than $n - 1$, and to study the related variational problems as in [1, Sect. 5].

On the other hand, it turns out that the isoperimetric inequality in Proposition 3.1 holds true if one assumes in addition that $u \in W^{1,n-1}(\Omega, \mathbb{R}^n)$. Therefore, using the same techniques as in [1], the $(n - k)$ -dimensional fracture $S_{n-k}(u)$ of maps u in $\text{Cf}^p(\Omega, \mathbb{R}^N) \cap W^{1,k-1}(\Omega, \mathbb{R}^N)$, see Definition 5.1, can be defined as in Definition 5.5, for every integer $2 \leq k \leq \min(n, N)$. Existence results can be then obtained for the minimum of the functional

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$$\mathcal{F}_k(u) := \int_{\tilde{\Omega}} \Phi(|\vec{M}(Du)|) dx + \int_{\tilde{\Omega}} |Du|^{k-1} dx + \mathcal{H}^{n-k}(S_{n-k}(u)),$$

for $2 \leq k \leq \min(n, N)$, where Φ is defined as in Theorems 5.9 and 5.10.

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Reference

1. Mucci, D.: Fractures and vector valued maps. *Calc. Var.* **22**, 391–420 (2005)