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CORRECTION

Correction to: Fundamental functions for local interpolation of quadrilateral meshes with extraordinary vertices

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In the original publication of the article, some figures and their descriptions are incorrect. This erratum corrects the same and adjusts the meaning of the notation R_ℓ^k in Definition 5.

In [1], Figure 2 and the text description at the beginning of page 374 should be replaced with the ones given below.

The illustrative example in Fig. 2 left (respectively, right) shows the degree-5 (respectively, degree-7) fundamental function with compact support $[-3, 3]$ *(respectively,* $[-4, 4]$*), that is obtained when selecting* Φ_ℓ *as a degree-2 (respectively, degree-3) polynomial B-spline and* $\mathcal{P}_\ell$ *as a degree-3 (respectively, degree-4) polynomial interpolating a subset of four (respectively, five) consecutive points* $(x_k, \delta_{k,j})$, $k \geq \ell$*. Since the assumption of Proposition 1 is fulfilled,* Ψ_j *is a fundamental function for interpolation. Moreover, according to Proposition 2, since* $m = 3$ *and* $w = 3$ *(respectively,* $m = 4$ *and* $w = 4$*), then the support width of* Ψ_j *is 6 (respectively, 8). Finally, according to Proposition 3, since* Φ_ℓ *is* C^1 *(respectively,* C^2*) then* Ψ_j *is* C^2 *(respectively,* C^3*).*

In [1], the following changes should be considered when reading pages 375–379:

- in the caption of Table 1 replace $\mathcal{R}_\ell^1$ with $\mathcal{R}_\ell^0$;
- in Definition 5 replace k-ring neighbourhood with $(k+1)$-ring neighbourhood;
- on page 375, two lines below eq. (3), replace $\mathcal{R}_\ell^{n+1}$ with $\mathcal{R}_\ell^n$;

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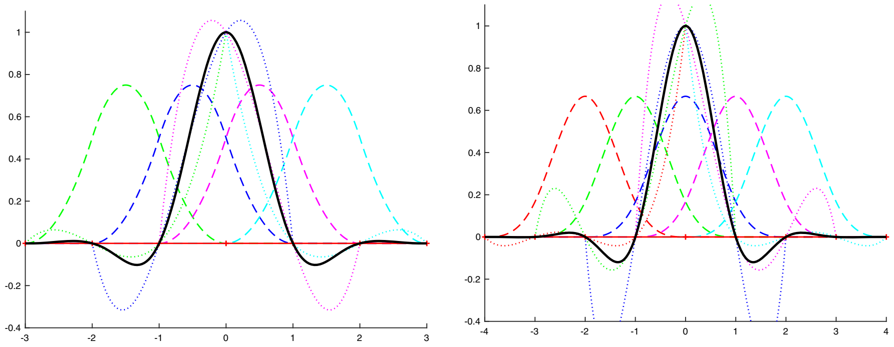

Fig. 2 Left: the C^2 fundamental function supported on $[-3, 3]$ that is obtained by using our constructive approach with the quadratic B-splines as blending functions. Right: the C^3 fundamental function supported on $[-4, 4]$ that is obtained by using our constructive approach with the cubic B-splines as blending functions. In both figures the interpolating polynomials blended by the B-splines (dashed graphs) are the dotted graphs

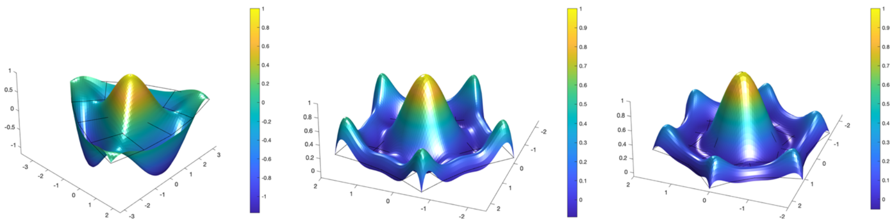

Fig. 3 Degree-6,7,8 bivariate polynomials that interpolate the $6N_\ell + 1$ points $(\boldsymbol{x}_k, \delta_{k,\ell})$, $\boldsymbol{x}_k \in \mathcal{R}^1_\ell$ and approximate in the least-squares sense the $6N_\ell$ points $(\boldsymbol{x}_k, 0)$, $\boldsymbol{x}_k \in \mathcal{R}^2_\ell \backslash \mathcal{R}^1_\ell$ when the valence of $\boldsymbol{x}_\ell$ is $N_\ell \in \{3, 5, 6\}$

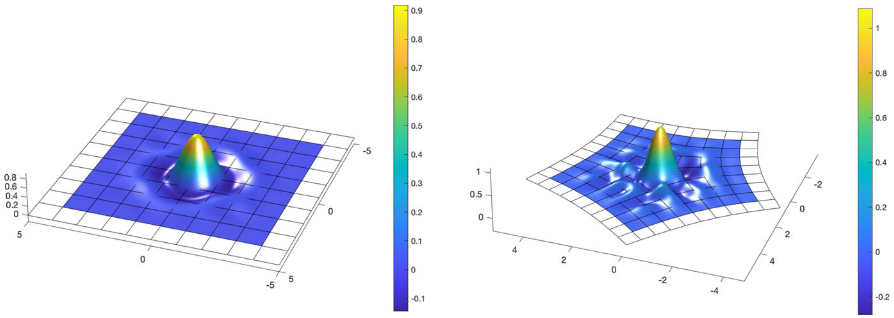

Fig. 4 Left: fundamental function for local interpolation that is defined on a regular subregion of Ω and is C^3 everywhere. Right: globally C^2 fundamental function that is centered at a valence-4 vertex and contains a valence-5 vertex in its support

- on page 376, line 7, replace $\mathcal{R}^{n+1}_\ell$ with $\mathcal{R}^n_\ell$;
- on page 376, line 16, replace $\mathcal{R}^2_\ell$ with $\mathcal{R}^1_\ell$;
- in Proposition 4, second line, replace $\mathcal{R}^{n+1}_\ell$ with $\mathcal{R}^n_\ell$;
- on page 379, fifth line from the bottom, replace 2-ring with 3-ring.

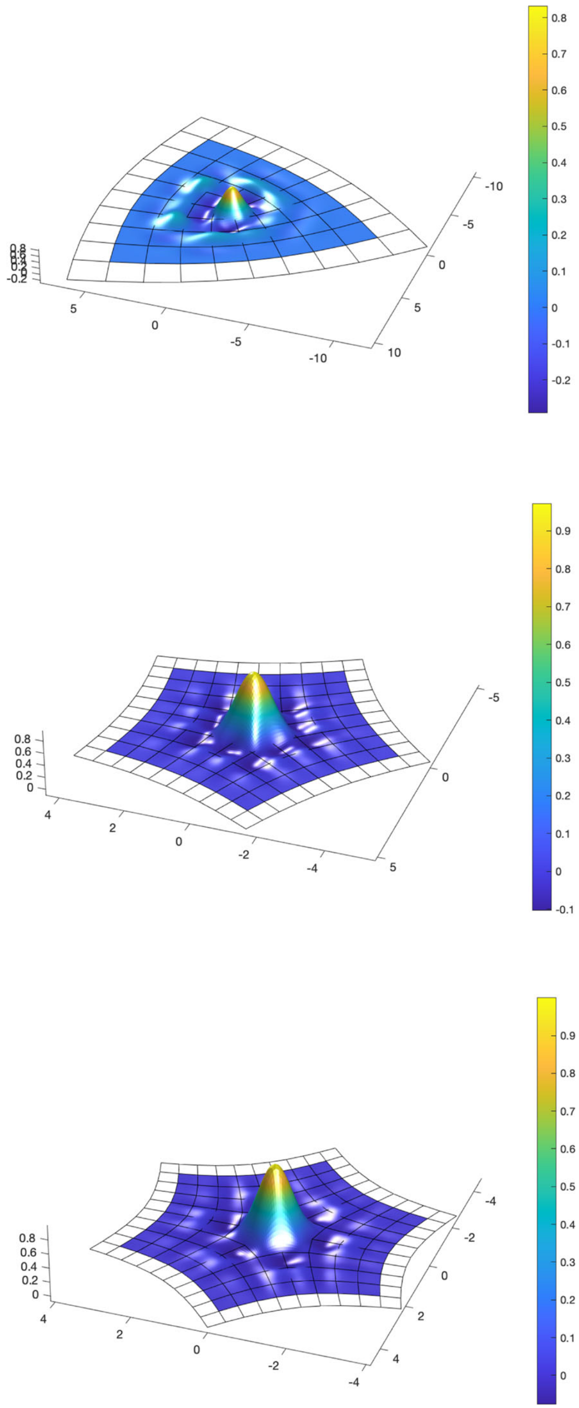

Fig. 5 First column: globally C^2 fundamental functions for local interpolation centered at an extraordinary vertex of valence 3, 5, 6

Additionally, the second paragraph of [1, Section 5] should be substituted with the following one:

As to the polynomial interpolants, since when $n = 1$ *condition (5) must hold for* $\#\mathcal{L}_\ell^1 = 6N_\ell + 1$ *with* $N_\ell \in \{3, 4, 5, 6\}$ *denoting the valence of* $\boldsymbol{x}_\ell$*, we should require that* $\dim(\Pi_d) \geq \max\{6N_\ell\} + 1$*. In our experiments we have worked with polynomials* $\mathcal{P}_{\ell,1}$ *of total degree* $6 \leq d \leq 8$*, as it is a reasonably low degree that allows us to satisfy the condition (5) for all valences up to 6. Hence, for a vertex* $\boldsymbol{x}_\ell$ *of valence* $N_\ell \leq 6$*, we have computed the coefficients of the degree-d polynomial* $\mathcal{P}_{\ell,1}$ *by solving a weighted least-squares fitting problem with big weights assigned to the* $6N_\ell + 1$ *interpolation points with parameter values in* $\mathcal{R}_\ell^1$*. Examples of bivariate polynomials that interpolate the* $6N_\ell + 1$ *points* $(\boldsymbol{x}_k, \delta_{k,\ell})$*,* $\boldsymbol{x}_k \in \mathcal{R}_\ell^1$ *and approximate in the least-squares sense the* $6N_\ell$ *points* $(\boldsymbol{x}_k, 0)$*,* $\boldsymbol{x}_k \in \mathcal{R}_\ell^2 \backslash \mathcal{R}_\ell^1$ *when the valence of* $\boldsymbol{x}_\ell$ *is* $N_\ell \in \{3, 5, 6\}$*, are shown in Fig. 3.*

Finally, Figure 4, 5 and the first column of Figure 5 in [1] should be replaced with the ones given below.

Reference

1. Beccari, C.V., Casciola, G., Romani, L.: Fundamental functions for local interpolation of quadrilateral meshes with extraordinary vertices. Annali dell'Università di Ferrara **68**, 369–383 (2022)