DSSY implementation on deal. II

Imbunm Kim

Seoul National University *ibkim11@gmail.com*

DSSY Nonconforming Quadrilateral Finite Element
(RAIRO Anam. Numer. 33, 1999, Douglas-Santos-Sheen-Ye)
On a reference domain $\hat{Q} := [-1,1]^2$, define
$DSSY(\hat{Q}) = span\{1, \hat{x}, \hat{y}, \theta_l(\hat{x}) - \theta_l(\hat{y})\}, \qquad l = 1,2$

$$\text{where} \quad \theta_l(x) := \begin{cases} x^2 - \frac{5}{3}x^4, & l = 1 \\ x^2 - \frac{25}{6}x^4 + \frac{7}{2}x^6, & l = 2 \end{cases} \tag{1}$$

The reference four DSSY degrees of freedom are given at the midpoints.
Let $F_Q : \hat{Q} \to Q$ be a bijective affine transformation. Then
$DSSY(Q) = \{\hat{v} \circ F_Q^{-1} | \hat{v} \in DSSY(\hat{Q})\}$. Then DSSY FEM is defined by
$DSSY^h = \{v \in L^2(\Omega) | v|_Q \in DSSY(Q) \quad \text{for all} Q \in$
τ_h; v is continuous at the midpoint of each interior edge$\}$

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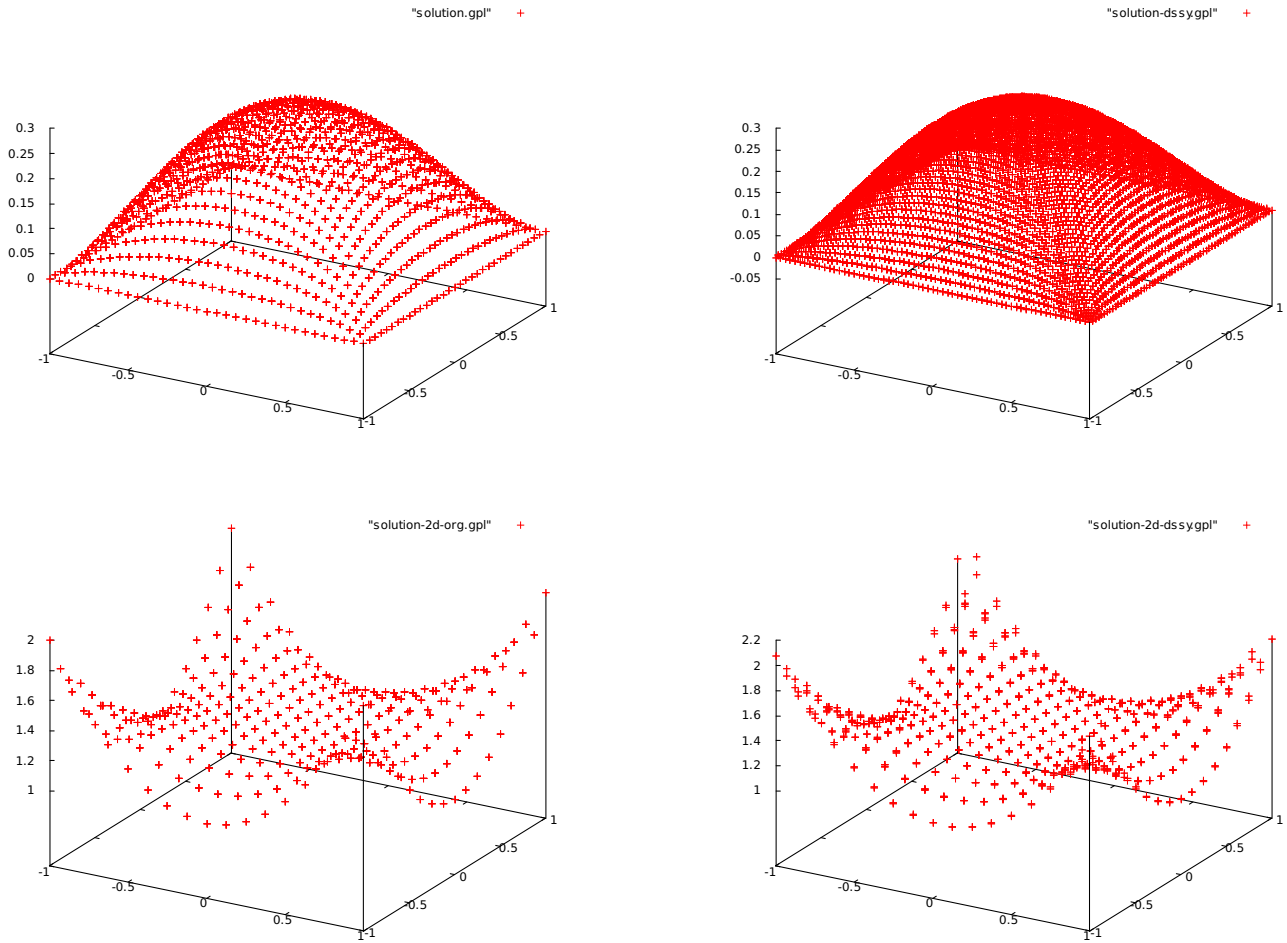

Figure: (step3) Q_1 CFE / DSSY NCFE solution (step4) Q_1 CFE / DSSY NCFE solution

Thing to do : Apply DSSY to other test problems ; Changes should be made in nonconforming sense