Comments and Corrections for "Bounds and Representations of Solutions of Planar Div-Curl Problems."

from Quarterly of Applied Mathematics Vol LXXV 2017, pp 505-524.

1. Theorem 4.2 is well known to only hold when the domain Ω is simply connected and is only used in this paper for corollary 4.3. The condition "(B1)" should be replaced by "(B1) with $J = 0$" in the theorem.

2. This corollary is a local, interior, result so the proof with Ω simply connected is sufficent to prove this result.

3. In view of the above the comments the first sentence on page 507 should have "when Ω is simply connected" added at its end. The last paragraph of section 4 should read

   Note that theorem 4.1 does not impose any topological conditions on the region Ω.

4. An intent of this paper, noted in the introduction, is to only use the CGH decomposition of theorem 4.1 and to avoid issues arising from the special special harmonic fields associated with the topology of Ω The proofs cited above by Girault and Raviart for regions in 3D hold for non-simply connected regions and 2D analogues may be proved using similar arguments. The irrotational (respectively solenoidal) fields that are gradients (Curls) must also be L^2-orthogonal to certain special harmonic fields associated associated with the topology - from de Rham theory.

5. In corollary 6.2, the field $\mathbf{v}$ is the one from theorem 6.1 and it is not claimed that (6.5) holds for all solutions of (5.1)-(6.1) - as should be clear from the next paragraph. When Ω is not simply connected then there will be J harmonic fields defined using stream functions as in section 10 of [1] in addition to this gradient field.

6. Similarly in corollary 7.2, the field $\mathbf{v}$ is the field from theorem 7.1 and the inequality (7.5) only holds for this solution.

GA. November 2017.