The right hand side in (15) can be rewritten by means of the identity

$$(\Phi^2 u^\varepsilon)_{-h} - \Phi^2 u^\varepsilon = \Phi^2_{-h}(u^\varepsilon_{-h} - u^\varepsilon) + (\Phi^2_{-h} - \Phi^2)\, u^\varepsilon =$$
$$= (\Phi^2_{-h} - \Phi^2)\,(u^\varepsilon_{-h} - u^\varepsilon) + \Phi^2(u^\varepsilon_{-h} - u^\varepsilon) + (\Phi^2_{-h} - \Phi^2)\, u^\varepsilon\,. \tag{29}$$

The functions $\Delta_{-h}(\Phi^2)$, Φ, Φ^2 are bounded independently of h. Moreover, it is easy to see that for $f \in [L_2(\Omega)]^m$ we have $\Delta_{-h}(f) \rightharpoonup \partial f / \partial x_i$ in the dual space $([W_2^1(\Omega^*)]^m)^*$. Especially, $\Delta_{-h}(f)$ are bounded in this space.

It follows from here and from (29) that the absolute value of the right hand side in (15) is not greater than

$$c_{17}(\|\Delta_{-h}(u^\varepsilon)\, \Phi\|_{2,1,\Omega} + \|u^\varepsilon\|_{2,1,\Omega}) h^2 \leqq c_{18} \|\Delta_{-h}(u^\varepsilon)\, \Phi\|_{2,1,\Omega} h^2\,.$$

Now all the estimates proved yield together the inequality (16). The proof of the theorem is complete.

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