Further, let us suppose

(27) $$a_0(x, s) \in C^1(\bar{\Omega} \times \langle -K, K \rangle) \quad \text{for each} \quad K > 0 .$$

Assertion 3. *If the conditions of Theorem* 3, *or Theorem* 4 *are fulfilled and moreover if* (27), (24), (25), (26), (i), *or* (ii), *are satisfied, then there exists a classical solution of the problem* (1'), (5) *from* $C^{2,\gamma}(\bar{\Omega})$, $0 < \gamma \leqq \alpha$.

With regard to Assertion 2, there exists a weak solution $u \in \mathbf{W}_2^1 \cap C^{0,\beta}$ of (1'), (5). Because of (27), $a_0(x, u) \in C^{0,\beta}(\bar{\Omega})$. Then the assertion 3 is a consequence of Schauder's theorem – see [6] (Theorem 1.1, Chap. 3).

Examples.

1 $$-\sum_{i=1}^{N} \frac{\partial}{\partial x_i}\left[l_i(x)\, g_i\left(\frac{\partial u}{\partial x_i}\right)\right] + a_0(x)\, g_0(u) = f$$

where $l_i(x) \geqq c > 0$ for $i = 1, 2, \ldots, N$ and $g_i(u) \in \mathbf{M}_3$ for $i = 1, 2, \ldots, N$, $g_0(u) \in \mathbf{M}_1$.

2 $$-\Delta u + a_0(x, u) = f$$

particularly,

$$-\Delta u + a_0(x)\, u \exp u^2 = f .$$

Bibliography

[1] *J. Kačur:* On the existence of the weak solution for non-linear partial differential equations of elliptic type. Comm. Math. Univ. Carolinae *11*, 1 (1970), 137–181.

[2] *J. Nečas:* Les méthodes directes en théorie des équations elliptiques. Prague, 1967.

[3] *М. А. Красносельский, Й. Б. Рутицкий:* Выпуклые функции и пространства Орлича. Москва 1965.

[4] *М. М. Вайнберг:* Варициoнные методы исследования нелинейных операторов. Москва, 1965

[5] *T. K. Donaldson, Neil S. Trudinger:* Orlicz-Sobolev spaces and imbedding theorems. Macquarie University, School of Mathematics and Physics, February, 1970.

[6] *O. A. Ladyzenskaya,* and *Ural'tseva:* Linear and quasi-linear differential equations of elliptic type. Publishing House "Science", Moskow, 1964 (Russian).

[7] *М. А. Красносельский:* Топологические методы в реории нелииейных интегральных уровнений. Москва, 1956.

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