Answer to the referee comments

First of all, we want to thank the referee for his thoughtful reading and comments. We have expanded the text according to the comments.

1. From the very beginning we treat the coefficients a, b, c as an arbitrary function of t. On this stage we prefer do not explicitly prescribe the possible dependence of the coefficients of function g on the distribution moments. Our main goal is to find the structure of the equations that determine the expectation and dispersion of the distribution in the case of any quadratic dependence on spatial coordinates (Theorem 2).

When the equations (17) and (18) are obtained, we can see that adding a dependence on the mathematical expectation and dispersion to the coefficients a and b complicates the equations or even couples them, forcing us to study a separate boundary value problem for the resulting system. This problem is nonlinear and there are no general methods for its analysis. Studying such problems in the general case is not the purpose of this paper. By way of illustration, we deliberately choose a type of dependency for which there is an explicit solution.

We added the explanations in Sec.2.1.

Moreover, we added Remark 3, in which we tried to explain why the case of independence of g of m is not so bad from a practical point of view, since it allows one to obtain explicit analytical results and does not significantly distort the behavior of the solution in comparison with the case $g(m)$.

2. The equation defining A is the Riccati equation, therefore its solution, generally speaking, cannot be extended over the entire interval $(0, T)$ and goes to infinity in a finite time $0 < T_* < T$ (see the example of Sec.3.1 for the simplest case of $a = \mathrm{const}$). However, this is not an obstacle, since for further reasoning it is only necessary to satisfy condition (9), and it can also be fulfilled when A turns to infinity. If there is an analytical expression for $A(t)$ on $(T_*, T]$, then we assume that the same expression defines the solution on $[0, T]$. If such an expression is unknown, then we solve the Cauchy problem on the interval $(T_1, T]$, $T_1 = T_* + \varepsilon$, $\varepsilon > 0$, make a change of variable $A_1 = \frac{1}{A}$, for which the Riccati equation is also valid, and solve the Cauchy problem for A_1 with the initial condition $A_1(T_1) = \frac{1}{A(T_1)}$ and then repeat this procedure as many times as necessary. Thus, a numerical implementation of the solution can be arranged if $a(t)$ is known in advance. If $a(t)$ is assumed to be a function of expectation and dispersion, then at this stage we will not be able to find A and all problems with solvability are transferred to problems (17) and (18).

The explanations are in Sec.2.2, Remark 1.

3. The function c was missed in (8), it is a typo, corrected.

4. Yes, if we assume the dependence of a and b on the moments, then the dependence will be in A and B, then the problem of finding moments in (14), (15) is nonlinear. We do not give a solution, but only set this problem.

5. Problems (16), (17), (18) are not necessarily solvable. Finding cases where the problem is solvable is difficult and beyond the scope of this paper. Nevertheless, we show that the set of solvable problems of this kind is not empty.

6. Note also that since (2) includes only the gradient of Φ, the results do not depend on the function $C(t)$, and therefore on the coefficient $c(t)$ (Remark 2).