$$d = 1 - (1 - D_A / D_0) \cdot (x / x_A)^2 \qquad (4)$$

As previously we run with the tool StatSoft 701 which is specific to data analysis.

In Figures 8, 9 and 10 there are represented on ordinate the relative values of toxic dose depending on the depth values x represented on abscissa for nonlinear distribution.

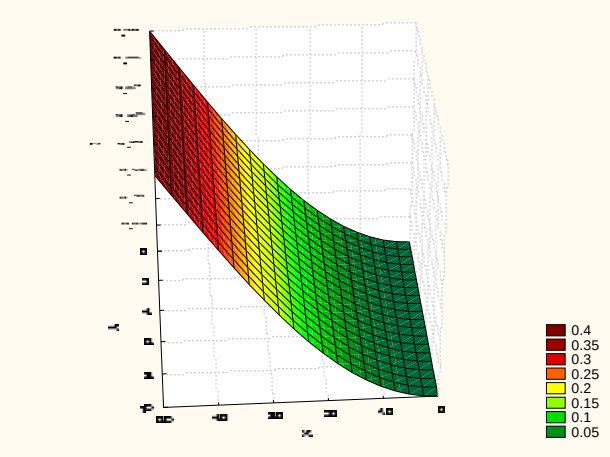

Fig.8 Nonlinear distribution of mass transfer at D_A/D_0=0.4; x_A=50

According to Fig.8 on the surface of contact (*x=0*) the toxic dose value is D = D_0**.** Relative dose decreases non-linear with the depth *x*. At the depth x_A = 50 the value of mass transfer is D_A/D_0=0.4.

According to Fig.9 on the surface of contact (*x=0*) the toxic dose value is D = D_0**.** Relative dose decreases non-linear with the depth *x*. At the depth x_A = 50 the value of mass transfer is D_A/D_0=0.2.

According to Fig.10 on the surface of contact (*x=0*) the toxic dose value is D = D_0**.** Relative dose decreases non-linear with the depth *x*. At the depth x_A = 50 the value of mass transfer is D_A/D_0=0.1.

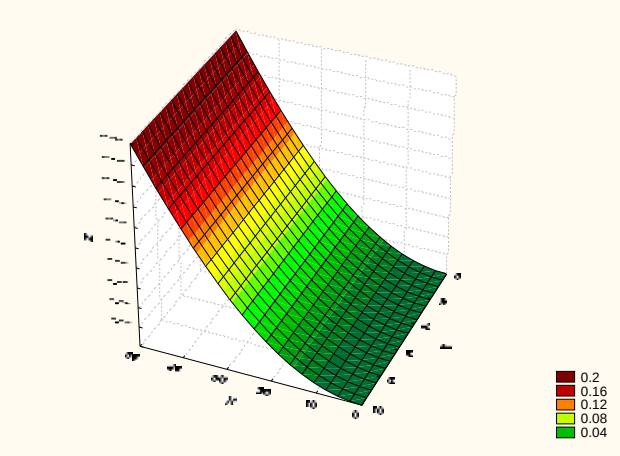

Fig.9 Nonlinear distribution of mass transfer at D_A/D_0=0.2; x_A=50

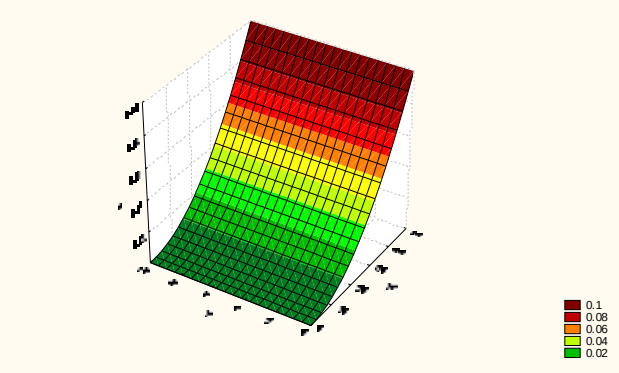

Fig.10 Nonlinear distribution of mass transfer at D_A/D_0=0.1; x_A=50

3 Discussion and Conclusions

Deposits of slag and ash produced by coal-fired power plants induce in living organisms, including the humans the specific environmental xenobiotics. As a consequence this impact is leading to a high incidence rate of malignant tumours.

It is important to identify specific mathematical models with a polluter environmental contamination in a well defined geographical area.

For deposits of slag and ash, defining mass transfer of a toxic dose in the subsoil can be done by identifying / building of a specific mathematical model. A mathematical pattern of mass transfer permits a dimensional calibration of slag and ash deposits. Linear mathematical model may be imposed for relatively small-scale work. For large-scale work is needed the transition to nonlinear mathematical models that can be described by differential equations.

Mathematical modeling is just a milestone to be followed by the numerical simulation of specific phenomena.

The case study carried out in this paper is based on the scenario of the transfer of a toxic dose in the subsoil from the slag and ash deposit on the ground of Isalnita power plant located in Oltenia region, Romania. Taking into consideration the spatial distribution of soil structure in depth it is analyzed the toxic mass transfer into the subsoil based on two scenarios, namely the linear and nonlinear distribution of mass transfer. Based on linear and, respectively nonlinear mathematical models there are performed numerical simulations of toxic mass transfer into the subsoil.

This study aims to emphasize that working within the framework of sustainable development the

environmental and technical issues can and should be linked. The operation of coal-fired electric generation stations is impacting all environmental factors, and future needs for sustainable development are likely to include a change in approaching the industrial metabolism concerns, by taking into consideration the interactions between humans applications and the Nature.

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