Introduction: It is common knowledge, that usually a dog is a friend to a man. There are very many examples which can confirm this thesis. And really, we know many cases when dogs/pets help in our life and even save a man if he/she is in a dangerous situation (into a water – to protect against to sink into the water), to defend against many people (robber, thief, violator, murderer). There are dogs which have the good skills like a leader/guide for the old people or in the case if a man is practically blind. On the other hand, there are many persons/owners who are ready to help their dogs, to feed, to wash, to treat, to go for a walk in any weather, to create rather comfortable conditions for living.

Unfortunately, each of us has the tendency to aging both a man and a dog. In this case we are needed to help to all of them. Elderly people very often have different diseases connected, for example, with a head (sclerosis/memory), with eyesight (cataract, glaucoma), with a heart (tachycardia), with lungs (pneumonia) and they can quickly gather big weight in accordance with their life activity. But let’s suppose the definite man periodically has a problem with his legs to go for a walk with his beloved dog twice a day and for a long time. So, in this article there is one example how to solve this problem for the old man using special cage with the automated system of a control. It helps for the animal to save shape and activity in the flat conditions without any walk. And at the same time there is one important information about a man who has the different activities in a life to protect against the obesity.

Key words: new cage, way to control, training for a dog, mobility of a man, change a weight, computer calculation, approximation.

Text 1. Automatic system for the dog’s cage
In really life the next situation can take place. One elderly person cannot go for a walk with his dog. What’s the reason? His laps have a strong ache today. It is so awful that it has forced to call a doctor and to stay at home with his beloved dog for a definite time. Luckily, this man recently saw many different cages in Internet [1-5] and has decided to get a new up-to-date cage (Fig. 1) /author – K.N. Voinov/ where the dog can run for a long time. But one problem can be suddenly appeared. It is connected with the situation if the owner of this dog went to sleep suddenly and for a long time or man’s weight is accelerating essentially because of the slow rhythm of the life. In this situation a control panel saves the situation and ceases the road movement in full or periodically switches on.

Figure 1 – Cage for a dog: 1 – design of this cage; 2 – mobile road and the velocity of movement can be corrected; 3 – door; 4 – niche to be resting for the dog; 5 – control panel
This cage helps you to have for the dog to get the active movement including even running.
**Text 2. Electrical and automatic control panel**
The principle sketch is shown below (Fig. 2).

**Figure 2** – The electrical sketch of device to stop the road movement at the definite time: right two black arrows go to the start relay; another two black arrows for the buttons of system to driving; moreover, this system can switch on the road for the dog automatically.

Thus, if the man cannot switch off this system (by different reasons), this system makes it itself automatically in the due time. Transducers help to work this system correctly by means of the put time programme and positions of the working buttons.

**Text 3. Investigations about the velocity how the weight of a man can change and grow up**

Such situations take place if the definite person can live in a different routine: quickly, quietly or slowly. It directly influences on the weight of a man, although, of course, many other factors can influence as well (genetics, health, temperament, personality and so on). In this part we show our investigations connected with the situation how the weight of three persons is changing during one year (360 ±4 days) if they have quite different behaviour, initial weight (51, 59.1 and 67.2 kg) and health. All results are given below including calculations, common diagram and a computer programme in MathCad [6-10].

\[

t_i := 0, 45, 90, 135, 180, 225, 270, 315, 360
\]

\[
\begin{align*}
W_{1i} & := 51.0, 51.2, 51.4, 51.4, 51.7, 52.0, 52.5, 52.7, 53.1 \\
W_{2i} & := 59.1, 59.4, 59.5, 59.9, 62.5, 64.8, 67.1, 68.0, 68.8 \\
W_{3i} & := 67.2, 69.0, 72.1, 72.1, 75.3, 79.2, 83.0, 85.9, 88.2
\end{align*}
\]

\[

t_0 := 180, \quad M := \frac{n + 1}{2}, \quad W_{01} := \frac{\sum W_{1i}}{n}, \quad W_{02} := \frac{\sum W_{2i}}{n}, \quad W_{03} := \frac{\sum W_{3i}}{n}
\]

\[
W_{01} = 51.889, \quad W_{02} = 63.233, \quad W_{03} = 76.889
\]
Now it is the possibility to write down three equations \( W_01i, W_02i, W_03i \) to describe the change for three weight, to construct the common chart (Fig. 3) and the numerical meanings of our calculations too:

**Short elucidation:**

- letter \( i \) – index; \( t_i \) – the term of observation (days);
- \( W_{1i}, W_{2i}, W_{3i} \) – are the alteration of the weight (kg) for each person;
- \( n \) – how many times the measuring was done;
- \( t_0 \) – average;
- \( h \) – the step of observation/weighing (in 45 days approximately);
- \( M \) – constant which it will be used in parabola formula during the calculations; \( W_{10}, W_{20}, W_{30} \) are the average meanings of the observed weight.

Further, we must determine two constants \( H_1 \) and \( H_2 \) and parameters for the parabola approximation \( a_1, a_2, a_3, b_1, b_2, b_3, c_1, c_2, c_3 \):

\[
\begin{align*}
H_1 & := n \cdot \frac{n^2 - 1}{12} \\
H_2 & := n \cdot \left( n^2 - 1 \right) \cdot \frac{n^2 - 4}{180} \\
\end{align*}
\]

\[
H_1 = 60 \quad H_2 = 308
\]

\[
a_1 := \frac{1}{3 \cdot H_2} \left[ 3 \cdot \left( \sum_i W_{1i} \cdot (i - M)^2 \right) - \frac{n^2 - 1}{4} \cdot \left( \sum_i W_{1i} \right) \right] \\
a_1 = 0.021
\]

\[
a_2 := \frac{1}{3 \cdot H_2} \left[ 3 \cdot \left( \sum_i W_{2i} \cdot (i - M)^2 \right) - \frac{n^2 - 1}{4} \cdot \left( \sum_i W_{2i} \right) \right] \\
a_2 = 0.098
\]

\[
a_3 := \frac{1}{3 \cdot H_2} \left[ 3 \cdot \left( \sum_i W_{3i} \cdot (i - M)^2 \right) - \frac{n^2 - 1}{4} \cdot \left( \sum_i W_{3i} \right) \right] \\
a_3 = 0.126
\]

\[
b_1 := \frac{1}{H_1} \cdot \left( \sum_i W_{1i} \cdot (i - M) \right) \\
b_1 = 0.262
\]

\[
b_2 := \frac{1}{H_1} \cdot \left( \sum_i W_{2i} \cdot (i - M) \right) \\
b_2 = 1.412
\]

\[
b_3 := \frac{1}{H_1} \cdot \left( \sum_i W_{3i} \cdot (i - M) \right) \\
b_3 = 2.727
\]

\[
c_1 := W_{10} - \frac{H_1 \cdot a_1}{n} \\
c_1 = 51.751
\]

\[
c_2 := W_{20} - \frac{H_1 \cdot a_2}{n} \\
c_2 = 62.582
\]

\[
c_3 := W_{30} - \frac{H_1 \cdot a_3}{n} \\
c_3 = 76.048
\]

Now it is the possibility to write down equations (W01i, W02i, W03i) to describe the change for three weight, to construct the common chart (Fig. 3) and the numerical meanings of our calculations too:
$W_{01i} := a_1 \cdot \frac{(t_i - t_0)^2}{h^2} + b_1 \cdot \frac{t_i - t_0}{h} + c_1$

$W_{02i} := a_1 \cdot \frac{(t_i - t_0)^2}{h^2} + b_2 \cdot \frac{t_i - t_0}{h} + c_2$

$W_{03i} := a_1 \cdot \frac{(t_i - t_0)^2}{h^2} + b_3 \cdot \frac{t_i - t_0}{h} + c_3$

<table>
<thead>
<tr>
<th>$W_{01i}$</th>
<th>$W_{02i}$</th>
<th>$W_{03i}$</th>
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<tr>
<td>51.035</td>
<td>57.266</td>
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<td>52.03</td>
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<td>65.488</td>
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<td>52.72</td>
<td>67.003</td>
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</tr>
<tr>
<td>53.12</td>
<td>68.559</td>
<td>87.285</td>
</tr>
</tbody>
</table>

Figure 3 – Total chart which represents the results of investigations linked with the change of the weight for three cases
Thus, \( W_{0i} \) (theoretical result) and \( W_{1i} \) (statistical data) describe the situation about weight for a man if he/she is living actively (many work, goes and even runs periodically); the correlation is very good; by the way, in the other cases too. \( W_{0i} \) (theoretical result) and \( W_{2i} \) (statistical information) for the person who lives without active movements (his/her weight grows up during the year). At last the third case if the person wants to rest, to sleep, to sit or to lie very often. Then his/her weight grows up rather quickly.

**Conclusion**

In this article two possible situations linked with the old man and his dog have just described. The new cage for a dog in which the animal can keep figure/shape, muscles and can run and rest is shown in here too.

Moreover, the special investigates are given connected with the situation if a man lives actively, calmly and passively by any reasons and it shows how his/her weight can be changed.

**References**


