**The laboratory work 12**

A single-cell model with absorption is given. 1 is a place of drug administration, 2 is a chamber.



The chamber is a space-limited volume of liquid (tissue), unchanged over time. A certain volume of medicinal product is given, which is absorbed into the chamber in proportion to its mass in accordance with the equation:

$\frac{dm}{dt}=-k\_{1}m$, where m is the mass of the drug at the place of administration, 1, k1 is the rate of entry of the drug into the chamber (rate constant of absorption).

It is assumed that the mass of the drug in 1 at the initial moment of time is equal to m0, and there is no preparation in the chamber at the initial moment of time. Then the mass of the drug in the chamber changes according to the following equation:

$$\frac{dm\_{1}}{dt}=k\_{1}m-k\_{el}m\_{1}$$

where m1 is the mass of the drug in the chamber, kel is the elimination constant (excretion) of the drug from the chamber.

As soon as the mass of the drug at the injection site becomes less than the threshold value ε, the time interval **Time** is recorder, after which all residues of the previous dose of the drug are destroyed at the injection site and a new dose m = m0 is injected.

Build a model of this system

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variant | m0 | k1 | kel | ε | Time |
| 1 | 45 mg | $$0.7 s^{-1}$$ | $$0.9 s^{-1}$$ | 0.01 mg | 20 s |
| 2 | 64 mg | $$0.5 s^{-1}$$ | $$0.7 s^{-1}$$ | 0.09 mg | 15 s |
| 3 | 25 mg | $$0.3 s^{-1}$$ | $$0.5 s^{-1}$$ | 0.001 mg | 10 s |
| 4 | 36 mg | $$0.6 s^{-1}$$ | $$0.8 s^{-1}$$ | 0.002 mg | 30 s |
| 5 | 30 mg | $$0.9 s^{-1}$$ | $$1.1 s^{-1}$$ | 0.004 mg | 45 s |
| 6 | 39 mg | $$0.3 s^{-1}$$ | $$0.5 s^{-1}$$ | 0.001 mg | 10 s |
| 7 | 43 mg | $$0.4 s^{-1}$$ | $$0.6 s^{-1}$$ | 0.095 mg | 50 s |
| 8 | 58 mg | $$0.7 s^{-1}$$ | $$0.9 s^{-1}$$ | 0.065 mg | 25 s |