

USE OF VENN DIAGRAM POSSIBILITIES IN ORGANIZATION OF LESSONS OF THEORETICAL MECHANICS

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Abstract: *The mentioned article talks about the issue of using Venn diagrams in lectures and practical classes on theoretical mechanics.*

Keywords: *Venn Diagram, Problem, First Problem, Second Problem, Constituent, Law of Motion, Mass, Force, Flat Truss, Nodal Shear Method, Shear Method, Graphical Method, Rod, Tension, Base Reaction Force.*

One of the main requirements for professors and teachers of higher educational institutions in our country is to organize classes for students and young people in a highly understandable, demonstrative and modern pedagogical and information technology. In order to perform these tasks, they are required to use interactive methods widely during the lessons organized for them. It's time to attract new ones to brainstorming, clustering, Venn diagram, and confused logical chain methods that are widely used by most scientists during training.

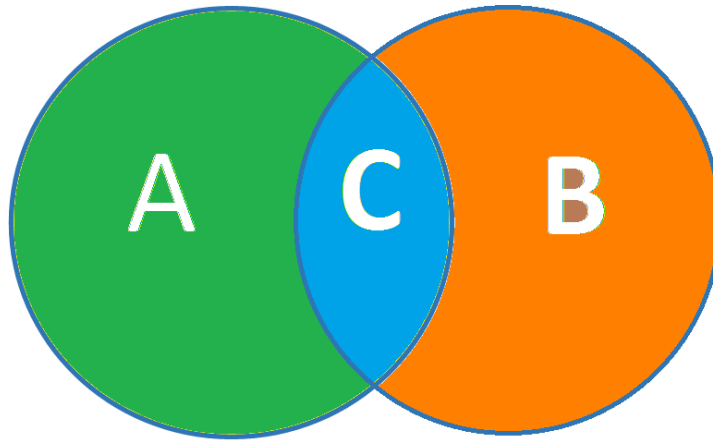
Theoretical mechanics is one of the basic subjects for specialization in technical higher education institutions. Let's consider the possibilities of using the Venn diagram, which is one of the interactive methods, in the lectures and practical classes organized in this subject. This interactive method provides an opportunity to visually convey lessons to students, to compare some concepts, key words, expressions, theorems, etc., and to distinguish their general and specific aspects. 'gives to teachers. In a Venn diagram, two or more intersecting circles are given within the framework of a lecture or practical exercise of the subject being taught, the specific aspects of the resource are written in its separate places, and the common aspects are written in the intersecting place. Individual and general features of the compared expressions can also be presented in a separate table.

Venn diagram interactive method in all departments of theoretical mechanics (moment of force relative to a point and an axis in statics, force system in plane and space, meeting and pair force system, types of motion in the department of kinematics when comparing the three methods in the calculation of farms, It is a convenient pedagogical method to use when comparing the manifestations of speed and acceleration in different movements, and in the department of dynamics, when comparing differential equations of motion of material points and mechanical systems, three types of oscillating motion.

In the example given below, a Venn diagram is created for the concepts of the first problem of dynamics and the second problem of dynamics on the topic "Two problems of dynamics" in the dynamics section of theoretical mechanics.

Venn diagram

A	Dynamics is the first issue
C	What A and B have in common
B	The second question of dynamics



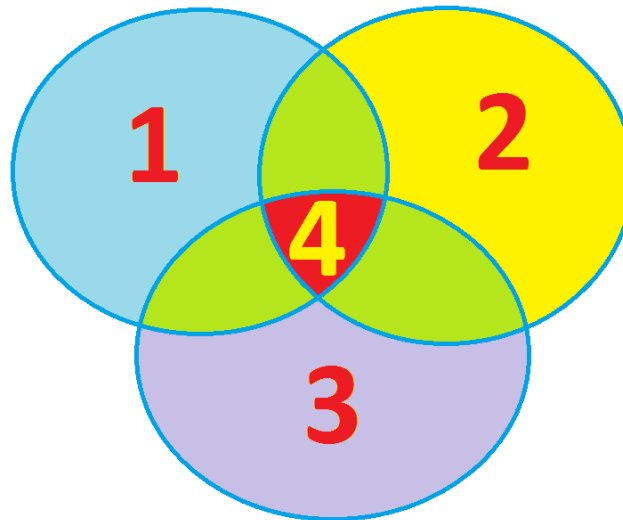
A	<p>Dynamics is the first issue</p> <ul style="list-style-type: none"> - when the mass of a material point and the law of motion are given, the effective force is found; - the derivative is taken twice from the law of motion; - the influencing force is found; - the opposite issue to the second one; <p>- if the body is in contact, given the law of motion and the acting force, contact reaction forces are found.</p>
C	<p>Common aspects</p> <ul style="list-style-type: none"> - the problem of dynamics is solved in both cases; - the basic law of dynamics is used; - the law of motion and the influencing force are found; - derivatives and integral operations are used; - the problem is mainly solved for a free material point; <p>- projections of the basic law of dynamics are used.</p>
B	<p>The second question of dynamics</p> <ul style="list-style-type: none"> - given the mass of a material point and the acting force, the law of motion is found; - is the main issue; - integration is used; - the opposite issue compared to the first; <p>- base reaction forces are found for the material point in the connection.</p>

By presenting the above diagram to the students during the teaching process, the two concepts from the main concepts of the dynamics department can be distinguished and understood by their unique individual and separate signs, and they will be able to acquire knowledge on how to easily solve problems related to such concepts in the future. will bring.

The second diagram of the Venn diagram shows the results of the comparison of three methods on the topic "Calculation of flat trusses" in the statics department of theoretical mechanics. The main methods of farm calculation are the knot cutting, cutting (Ritter) and graphical (Maxwell-Cremona) methods, and their specific and general aspects are compared.

In this diagram, the essence of the problem is solved through three intersecting circles. The following table describes in detail the specific and general aspects of the size of each circle, as well as the similarities.

Venn diagram



1.	Knot cutting method	<ul style="list-style-type: none"> - all nodes of the farm are cut in a row; - the balance of each node is checked separately; - all stresses are found analytically; - tensions in all the sterns are found; - usually used for flat farms; - before the truss support reaction forces are found.
2.	Ritter - cutting method	<ul style="list-style-type: none"> - used only to find the required tension of the stern; - projection or moment equation is used; - the farm is divided into two parts through the cross-section through 3 booms, and one part is checked for balance; - usually used in flat farms; - is an analytical method.
3.	Graph (Cremona-Maxwell) method	<ul style="list-style-type: none"> - is a geometric method; - the balance of force vectors and stress vectors is used; - tensions in all the sterns are found; - the problem is solved without requiring a formula; - is based on the closure of the force polygon in equilibrium.
4.	1, 2, 3- common between sizes parties	<ul style="list-style-type: none"> - farm account is performed in all; - the tension in the farm struts is found; - used for spatial and flat farms; - the same result is obtained; - base reaction forces and stresses are found; - solves one of the main concepts of statics.

In conclusion, by using Venn diagram in lectures on theoretical mechanics, students' knowledge level increases qualitatively, their ability to observe expands, the sense of comparing magnitudes and dividing into parts is formed, first the topic, and then will be able to describe and

imagine the chapter, and then the science in terms of wholes and parts. All these situations ultimately lead to an increase in the student's level of knowledge.

It was observed that the level of students' knowledge increased significantly as a result of teaching using the Venn diagram interactive method in the course of conducting theoretical mechanics lectures and practical training classes. So, it has been proven that it is possible to increase the level of students' knowledge by using the interactive Venn diagram in the course of the lesson.

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