Translational equilibrium lab

To continue to enjoy our site, we ask that you err on your identity as a person. Thank you so much for your cooperation. Click here for the revised instructions for this lab. Forces are one of a group of quantities known as vectors, distinguished by normal numbers (called scalars) by the fact that the vector has two quantities associated with it, order of magnitude and direction (related to coordinates of the system you are dealing with). These properties completely characterize a vector. A vector can be described alternatively by specifying its vector components. In the case of the Cartesian coordinate system (the system we will primarily deal with) there are two components, the x-component and the y element. Vectors, and in the case of this laboratory, power vectors, can be represented pictorially (see image 1) by arrow pointing to the direction of operation of the force, with a proportional length to the force (size) of the force. Figure 1 The elements and x and y instructions of the vector F are related to size F and angle of: (1) $F_x = F \cos$ ơ and $F_y = F \sin$ yen and against: (2) $F = F_x2 + F_y2$, and β = arctan. When several forces act on a point, their sum can be obtained according to the rules of vector algebra. Graphically, the sum of two forces can be found by using the equivalent rule illustrated in feature 2 or, equivalent, by the head-to-tail method illustrated in feature 3. Figure 2 Figure 3 The sum of vectors can also be cut analytically by adding their components: (3) $F_x = F_{1x} + F_{2x}$, and $F_y = F_{1y} + F_{2y}$ Object is in translation equilibrium when the vector amount of all forces running on it is zero. In this experiment we will study the translational equilibrium of a small ring performed by several forces on a system known as a power table, see Stitch 4. This system allows one to cause gravitational forces acting on several blocks (F = mag) to be brought to bear on the small ring. These forces are adjusted until the equilibrium of the ring is achieved. You then add the powers analytically by adding their elements and graphics by drawing the vectors and determining whether they add to zero by using the rules for adding power vectors listed above. Figure 4 We will first learn the equilibrium of the small ring when there are three forces acting on it. Two of the forces will be repaired and the third will be adjusted to equilibrium. 1 If necessary, enter the power table using the small bubble level located across the table. 2 Select all two masses you like in the 100-300g range, and place each mass on a weight holder. Use the electronic balance to measure each mass, including a husband. Specify the measured masses as the uncertainty of these measurements should be limited to the preciseness of the balance. 3 Place the pin in the middle of the power table and place the ring over Connect two of the four pulleys provided to the power table in any position other than zero degrees. Rihya vibrates the value of value value value value value value value value value value 1 and β2. The uncertainty at these angles should be limited to the accuracy with which you can read the angles on the power table. 4 Activate two of the strings (attached to the ring) above the pulleys, and suspend the masses you have chosen at the appropriate angles The voltage in both strings runs on the ring with forces each with an order of magnitude equal to the equivalent mass weight and holds hanging at the end of each string. 5 Pull one of the remaining strings in different directions until you locate a direction in which the ring is released from the pin when you apply the correct amount of force. A third pulley member in this position. Activate the string over the pulley and attach a weight holder to the string. Add weights to the weight holder until the ring moves away from the pin, so the pin doesn't work out to hold the ring in place. This last additional power is (equilibrium) power may need to make slight adjustments to the angle to achieve accurate measurement. Make sure the strings are radially stretched and the pin is in the center of the ring. Assess the uncertainty in equilibrium by adjusting the mass and angle until the system is no longer on balance. 1 Now choose three blocks (to provide three forces with a sum at three angles (one of them zero) and determine what one fourth mass and angle bases equilibrium on the power table (equilibrium power 2 record all angles, Masses and their uncertainty like equilibrium with three forces. Be sure to commit to your work, start your data, and give the cell in the genesis of the boxes your data. 1 Draw power diagrams to instigation. For example, 5 newton = 1 cm. Use everything that works best to give you the greatest plot accuracy. 2 Use the Medell method to find the sum of the forces graphically. Be as precise as possible. Make sure that the amount is zero qualitatively. Other than, set the size of the sediment from scratch from the graph. Calculate the power generated on the ring, analytically for equilibrium with only three forces. Select Zero Degrees so that there is an hinge +x and 90° to be a +y axis. 1 Use the tables in the WebAssign question to enter the data for the forces running on the ring. For each force, include the size F, its uncertainty and UF, its direction, and its uncertainty and values of must be reflected in the units of radians. 2 Calculate the x-elements and y elements of each force along with their errors. Note the symbol of each element. Include the sum of elements and their error in the last row of the table. 3 Calculate the magnitude and Of the resulting power also calculates the uncertainty of the magnitude. Is the condition for static equilibrium satisfied with both parts of the experiment? How is your uncertainty compared to the accuracy of your power and angle measurements? Discuss the sources of the systematic error and how they affect your results. What is the primary source of error in this experiment? Discuss your attempts to reduce systematic and random errors. What did you learn or find out from this lab? When can you apply the skills learned from this lab? Lab?