Aliran compressible adalah pdf

The meaning of Bernoulli's law. Dynamic fluid is a liquid that experiences movement that forms a stream that has a certain speed. There are two types of flow in the flowing liquid, namely the rationalization of the flow and turbulent.a). optimization is a thread that follows a straight or curved line that is clearly the tip and base. Thus, the flow of each particle that passes through the point, following the same lines as the other particles that pass through that point. The direction of movement of particles in the current line stream is called the current line. This thread is commonly referred to as laminar flow. In other words, a laminar flow is a flow of liquid that flows anywhere in the liquid without change over time.b). A turbulent stream is a rotating stream or stream, the direction of movement of a particle is different even in contrast to the direction of the general movement of the liquid. In other words, a turbulent stream is a fluid flow that can change the flow rate of each point of liquid. The flow of laminar fluid is an image of an ideal liquid called a stationary stream. The ideal fuid is a liquid that is independent of the press force it receives. That is, the volume and mass of the type do not change, despite the pressure. The ideal FluidFluida feature has the following characteristics. You can not compress liquids (or uncontrollable), i.e. the volume and density do not change, even if the liquid is under pressure. This liquid does not experience friction with the surface of the wall where it flows. The fluid flow rate is laminar. This means that each particle has a specific flow line and for the same cross-section area will have the same speed. The EquationDebit fluid discharge stream is a value that indicates the volume of fluid flowing through the cross-section of each unit of time. Fluid flow discharge can be mathematically expressed through equations such as the following. Debit - Fluid volume/time. v - V/tWith descriptionV - flow fluid volume (m3), t - time (seconds, s),A - cross-section area (m2), v - flow rate (m/s), - fluid flow discharge (m3/s). An example of the calculation of the discharge of the flow of liquid FormulaFluida Water flows in the tube, which fingers 10 cm at a speed of 10 cm/ sec. What is the rate of volume flow? Bypass :D:r 10 cm, v 10 cm/det Answer: v' π (10)2 (10) - 3.14 x 100 x 10 3140 cm3/det Continuity of EqualityIf the inept water liquid flowed for eternity or the flow of liquid called continuity. This continuity or eternity of discharge can be expressed by the formula of the continuity equation as outlined as follows. No 1 - No 2A1 v1 - Continuity Equality A2 v2, Fluid Discharge EternityEpt Problem dynamic fluid testing, debit formula calculation Water flows in a large transverse tube of 200 cm2 and a flow speed of 3 m/s, then the water flows into a small pipe, the area of cross-section of which is 50 cm2. Identify: reset on small pipes, water speed on small pipes! CompletionA1 - 200 cm2 - 2.10-2 m2v1 - 3 m/sa2, 50 cm2 - 5.10-3 m22 - 12 - A1 v1-2 - 2.10-2. 3 - 6.10-2 m3/SSS In a small pipe occurs: A2 v2'A1 v150. v2 No 200 . The 3v2 and 12 m/s Bernoulli Legal Equality Bernoulli Act states that the amount of pressure, kinetic energy per unit volume, and the potential energy per unit volume have the same value at each point along the ideal flow of liquid. Bernoulli's law can be expressed using formulas such as the following mathematical equations.p'1/2 qv2gh2 with the signature : pressure (N/m2), v - fluid flow rate (m/s), g - gravitational acceleration (m/s2), h - the height of the pipe from the soil (m), dan' - the density of liquidExample Test Case, calculating the legal formula BernoulliBejana, which has a height of 4 m. The ship has two holes, which are 1 m on top, and the other 1 m from the bottom. Determine the speed of water flow in both holes. Example Exam Problem Calculating Bernoulli Legal Formula on perforated tubesS1 - 1m (bottom) h2 (4 x 1) - 3m (bottom) Water flow rate in a hole below 1 - √ (2gh1)v1 - √ (2x10x1)v1 √ No1 (20) above v2 - √ (2gh2)v2 - √ (2×10 x3) v2 √ (60) - 7.75 m/s. Test for calculation with Bernoulli Legal FormulaThe following image The countdown with the legal formula of Bernoulli Large diameter of the small diameter of the pipe of the small diameter of the large and small diameter of the pipe is respectively 5 cm and 3 cm respectively. Jika diketahui tekanan di A1 pada pipa besar adalah sebesar 16 x 104N/m2 dan memiliki kecepatan 3 m/s, maka hitunglah tekanan dan kecepatan di A2Diketahui :p1 = 16 × 104 N/m2r = 1 g/cm3 = 1.000 kg/m3v1 = 3 m/sd1 = 5 cmd2 = 3 cmDitanyakan:JawabKecepatan di A2 adalahv2 = (A1v1)/A2v2 = (d12 v1)/d22v2 = (52 x 3)/32v2 = 8,3 m/sTekanan di A2p2 = p1 + 1/2 r (v22 – v12)p2 = 16 x 104 +1/2 x1000 (8,32 – 32)p2 = 18,99 x 104 N/m2Penerapan Asas BernoulliBeberapa peristiwa atau peralatan dalam kehidupan sehari hari yang menerapkan prinsip hukum Bernoulli, diantaranya adalah, tangki berlubang (penampungan air), alat penyemprot (obat nyamuk dan parfum), karburator, venturimeter, tabung pitot, dan gaya angkat pesawat terbang. Bernoulli's legal equation in the Bernoulli Perforated Tank can be used to determine the speed at which fluids come out of holes in the walls of pipes or tanks. Assuming the diameter of the tube is larger than the diameter of the hole, the surface of the liquid matter on the tube slowly falls. On the surface of the liquid at point A, the rate at which the liquid falls is relatively low can be ignored or considered zero (v1 and 0). While the p1 pressure on the surface of the A1 point liquid and the p2 pressure in the tank holes are the same. Thus, Bernoulli's equation becomes as follows: p1'1/2 q v12'gh1'p2'1/2 q v22'gh2p1'p2v1'0Te torricelliSpeed of the flow of liquid in reservoir holes can be calculated using formulal equations, such as the followingp1 - 1/2 x 02 - sgh1 - p1 - 1/2 v22 1 - h2) - 1/2v22 or v2 - v (flow speed in the tank hole) v - 2 g (h1 - h2) - 0.5 orr - √ qlt;2 qgt; √ This equation is called the Torricelli Theory, which states that the flow rate of liquids into the hole is equal to the speed at which objects fall freely from the same height. Torricelli's theory of the Long Distance Formula Fall Fliuda at Ground LevelPoints C to D is the furthest distance fliuda falls at ground level and is notified with the letter R. Distance R can be determined by the next formula of the equation. R No 2√ (h.h2)C kerteranganR and horizontal fluid distance in the ground to the tube tank wall (m)h - the opening distance to the top surface of the tank (m)h2 distance from the hole of the cork tank from the ground (m)Or it can also be caused by similarities such as the following R q v.t Description - the flow rate of fluid in the tank Although t can be defined by the following equation Example Bernoulli Legal Formula Calculating Exam - Torricelli TheorySoal 1. The drum is 7.5 m deep filled with water. The drum sits above ground level flat. There is a hole on the drum wall 2.5 meters away from the base of the drum, and the water gushes from the hole. Example Bernoulli Legal Formula Calculation Exam - Torricelli TheoryIf G 10 m /s3, calculate: the speed of water comes out of the tank hole of the far horizontal distance reached by water at ground levelFulrest found: Drum height h1 and 7.5 m ; Hole height from h2 ground - 2.5 m; d - 10 m / s2Itanya: Answer :a. Distance from the top surface of the tabungha liquid tank - h1 - h2h - 7.5- 2.5h - 5 m flow rate from the tank hole is calculated following equal √ (2gh) v √ (2x10x5)v √ √ (100)v 10 m/s horizontal water falling from the wall, tank calculated by the following equation R 2√h.h.h2R and 2√5 x 2.5R and 7.07 mOr can be calculated using the following equation formula: R'v. Travel time falls on the ground, calculated by the following equation: √ (2h2/g)t - √ (2x,2,5)/10't - 0.707secand R is calculated with the following equation: R'v. The tR container No. 10 x 0.707R and 7.07 mVenturimeter without Venturimeter is a venturimeter that is a tool installed on a flow pipe to measure the speed or speed of liquids. There are two adventurimes that are venturimeters gauges and venturers use gauges containing other fluids. The venturimeter without the gauge, based on the equation of hydrostatic pressure, the pressure at points 1 and 2 is: P1 - P0 'rgh1P2 - P0 - rgh2P1- P2 - rg (h1 - h2) - rghh - difference in the height of the liquid surface in the capillary tube over a large cross-section and a small cross section. The speed of fluid flow in large pipes is v1 - A2√ (2gh)/ (A12 - A22) With the descriptionv1 - the speed of liquid flow on large pipes (m/s) A1 - a large area of the cross section of the pipe (m2)A2 - a small area across the Tube section (m2) - fluid density (kg/m3) h - difference in the surface height of the liquid in the gauge (m)g - gravitational acceleration (m/s2)Example of Bernoulli's right problem for Venturimeter without the ManometerThrough venturi tube, as in the image of water, so the difference in the height of the water level in both narrow vessels, installed on the venturi pipe, If the cross-section area is large and small on the venturi pipe 100 cm2 and 10 cm2 and g 10 m/s2 respectively, and the water density is 1 g/m3, without the Gauge) calculate the difference in pressure at the point at a large and small cross section) the rate of water entry into the venturissionknown :h - 5 cm, 10 m/s2A1 - 100 cm2; - 1 g/m3A2 - 10 cm2Itanya: Answer :P 1 - P2 1. 1000 . 5 and 5000 dain/cm2b). Venturiv1 - A2√ (2gh)/(A12 - A22)'v1 - 10√ (2x10×5)/ (1002 - 102) is a tool used to measure the flow rate of gas or air in pipes or pipes. The Pitot tube consists of a venturi pipe containing mercury. Tip A opens up, while the B-tip extends in the direction of the air. When the state is already balanced, when considering the state at Adan B, the speed is at point B VB No 0. Because the pipe is flat, the hA and hB.The difference in mercury height in the pitoth tube is caused by pressure in the titk A and point B.Pitot pipe tool to measure flowby air gas using the bernoulli equation to: PB No 0 th PA 1-2 . Hf. vA2PB - PA No 1-2 . Hf. vA2 This pressure difference is the same as the hydrostatic pressure of the liquid (mercury) on the gauge. PB - PA and Hg. hv - √ (2.rHg g.h)/rf'vA - the fluid flow rate at point A (m/s) Pitot tube is used to measure the speed of air that passes through the tunnel. The pit tube is equipped with an alcoholic gauge (ra 800 kg/m3). If the difference in height between the two legs of the gauge is 18 cm and the air density _u 1.2 kg/m3, then the speed of air flow? (g 10 m/s2). Famous : yu 1.2 kg/m3sha - 800 kg/m3h - 18 cm, 0.18 mg - 10 m/s2Itanya :v applicable in pitot.v - √ (2.ra g.h)/en'v - √ (2x800x10x18)/1.2'v - √ 2400 20√6 m/s. The style of the aircraft wing has a sharp back and the upper side is more curved than the other side. This form results in airflow speeds through the upper side of the v1 aircraft exceeding the airflow speed at the bottom of the v2 wing. Depending on Bernoulli's law, places with higher pressure rates will be lower. Airplane wing lift type, test example currently the line on the top side is tighter than the lower side. That is, the airflow speed on the top side of the aircraft v2 is greater than the lower side of the v1 wing. According to the bornoulli principle, the pressure on the upper side of the p2 is less than the lower side of the p1, because the air speed is greater. With A as a wide cross-section of the aircraft, the size of the lifting force can be known through the following equations. Planes can be raised up if the lifting force exceeds the weight of the aircraft. Thus, the aircraft can fly or not depending on the weight of the aircraft, the speed of the aircraft and the size of its wings. The higher the speed of the aircraft, the greater the speed of the air. This means that the force of lifting the wing of the aircraft is getting bigger. Similarly, the larger the size of the wings, the larger the style of the elevator. In order for the aircraft to rise, the lifting force must be greater than the weight of the aircraft (F1 - F2) qgt; m. If the aircraft is at a certain altitude and the pilot wants to maintain its altitude (hanging in the air), the speed of the aircraft should be set in such a way that the lifting force is equal to the weight of the aircraft (F1 - F2) - m.For example, the test of the lifting force of the Aircraft Bernoulli Legal Calculation, If the air speed at the bottom of the aircraft flying 60 m/s, and the upward pressure received by the aircraft is 10 N/m. Calculate the airflow speed at the top of the aircraft (Air P - 1.29 kg/m3)Completion:P1 - P2 - 10 N/m2;h1 - h2v2 - 60 m/s; v12 . . G. h1 - P2 - 1-2 . v22 . . G. h21-2 (v12 v22) - P1 - P2v12 No22 2 (P2 - P1)/Sv1 - √ (3615 504)v1 - 60 129 m/sExample Aircraft Wing Wing Lift Force Test, Legal calculation bernoulli Air Wing ForceAn aircraft that has wings with a wingspan of 40 m2 moving resulting in a difference in airflow speed at the top of the wing and bottom, each of which is 240 m / with dn 200 m/s.What is the size of the force lifting on the wing if the air density is 1.3 kg/m3? Answer: Diketahuia 10m2v1 - 200m/sv2 - 240m/su - 1.3kg/m3F1 - F2 - 1/2 qu A (v12 - v 22)F1 - F2 - 1/2 x 1.3 x 40x (240)2 -(200)2'F1 - F2 - 457.6 kNJadi elevator on the wing of the aircraft 457.6 kNNu nuclear nucleus reaction, fission reaction and fusion reaction. Wave Type and its PropertiesMomen Force and Inertia Rotation Dynamics Understanding Example of Calculating Formula Hooke Legal Elasticity, Formula Settings Replacement Arrangement Parallel Series Spring Black ObjectsPank Gravity Newton Law: Understanding Formula Directions Solar Mass Tension , Example Issues and DiscussionChanges Substance Forms: Understanding the Impact of the Hidden Calorie Melting Point of Boiling Steam Dew Example The Example of Calculation.Wave LightGetaran and WaveMassions Defects and Energy Connect Atomic Cores, Dynamic Electrical Resistance ChainsCalcular Length Adjustment Volume: Understanding the Muay Coefficient, Example of calculation Formula 10Leave Shift Law Wien.Fast Rambat Sound Wave How the Transformer Generator Works : Understanding the rotation angle Speed, strong secondary voltage primary Twist Current, Example of calculating direct motion changes in free fall Parabolic order down: Example Of The Formula 1, Carnot : Sears, F.W - Semarnsky, MW, 1963, Physics for Universities, Bina Cipta Publisher, Bandung, Physics for Scientists and Engineers with Modern Physics, Third Edition. 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