

Answer on Question #38268, Physics, Other

Question:

A boat moves through the water with two forces acting on it. One is a 2.17×10^3 N forward push by the motor, and the other is a 1.72×10^3 N resistive force due to the water. What is the acceleration of the 1258.6 kg boat? Answer in units of m/s^2

Answer:

Newton's second law of motion can be expressed in equation form as follows:

$$\sum \vec{F} = m\vec{a}$$

$$ma = F - F_r$$

where F is force of motor, F_r is resistive force

Therefore, acceleration equals:

$$a = \frac{F - F_r}{m} = \frac{2.17 * 10^3 - 1.72 * 10^3}{1258.2} \frac{N}{kg} = 0.358 \frac{m}{s^2}$$

Answer: $0.358 \frac{m}{s^2}$