

**ABSTRAK**

**PENGUKURAN MOMEN INERSIA BOLA PEJAL  
MELALUI GERAK MENGGELINDING PADA BIDANG MIRING  
DENGAN ANALISIS VIDEO BERBANTUAN *SOFTWARE TRACKER***

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Telah dilakukan pengukuran momen inersia bola pejal melalui gerak menggelinding pada bidang miring dengan analisis video berbantuan *software tracker*. Gerak bola pejal merupakan gerak menggelinding yang menggabungkan gerak rotasi dan gerak translasi. Gerak menggelinding bola direkam menggunakan kamera yang kemudian dianalisis menggunakan *software tracker* untuk memperoleh waktu yang ditempuh bola selama menggelinding diatas bidang miring pada panjang lintasan dan sudut kemiringan tertentu. Terdapat dua variasi eksperimen, yaitu: (1) variasi panjang lintasan pada sudut kemiringan bidang tertentu, dimana nilai momen inersia diperoleh dengan menganalisis grafik fungsi waktu tempuh kuadrat terhadap panjang lintasan dan (2) variasi sudut kemiringan bidang pada panjang lintasan tertentu, dimana nilai momen inersia diperoleh dengan menganalisis grafik fungsi waktu tempuh kuadrat terhadap  $\csc \theta$ . Hasil momen inersia dihitung koreksi eror relatif terhadap nilai momen inersia teori. Setiap percobaan diulang sebanyak tiga kali untuk membuktikan ketidakteraturan presentase koreksi error relatif. Melalui penelitian ini didapatkan pengaturan alat eksperimen dan tata letak kamera serta panjang lintasan dan sudut kemiringan yang efektif untuk menghasilkan momen inersia paling mendekati teori.

**Kata kunci:** momen inersia, bola pejal, gerak menggelinding, bidang miring, dan video analisis tracker.

**ABSTRACT**

**MEASUREMENT OF MOMENT OF INERTIA OF SOLID BALL  
THROUGH ROLLING MOTION ON AN INCLINED PLANE WITH  
TRACKER SOFTWARE-ASSISTED VIDEO ANALYSIS**

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*Measurement of the moment of inertia of a solid ball through rolling motion on an inclined plane with video analysis assisted by tracker software has been carried out. The motion of solid ball was a rolling motion that combined rotational motion and translational motion. The rolling motion of ball was recorded using a camera which was then analyzed using tracker software to obtain time taken by the ball while rolling on an inclined plane at a certain track length and tilt angle. There were two experimental variations, namely: (1) the variations in length of track at certain angles of inclined plane where the value of moment of inertia was obtained by analyzing the graph function of travel time squared against the length of track and (2) the variations in angle of inclined plane at certain lengths of track where the value of moment of inertia was obtained by analyzing the graph function of travel time squared against  $\csc \theta$ . As a result, the moment of inertia was calculated as correction error relatif to the theoretical moment of inertia's value. Each experiment was repeated three times to prove the irregularity of the relatif error correction percentage. Through this research, the experimental setup and camera layout as well as the effective trajectory length and tilt angle are obtained to produce the moment of inertia closest to the theory.*

**Keywords:** *moment of inertia, solid ball, inclined plane rolling motion, and video tracker analysis.*