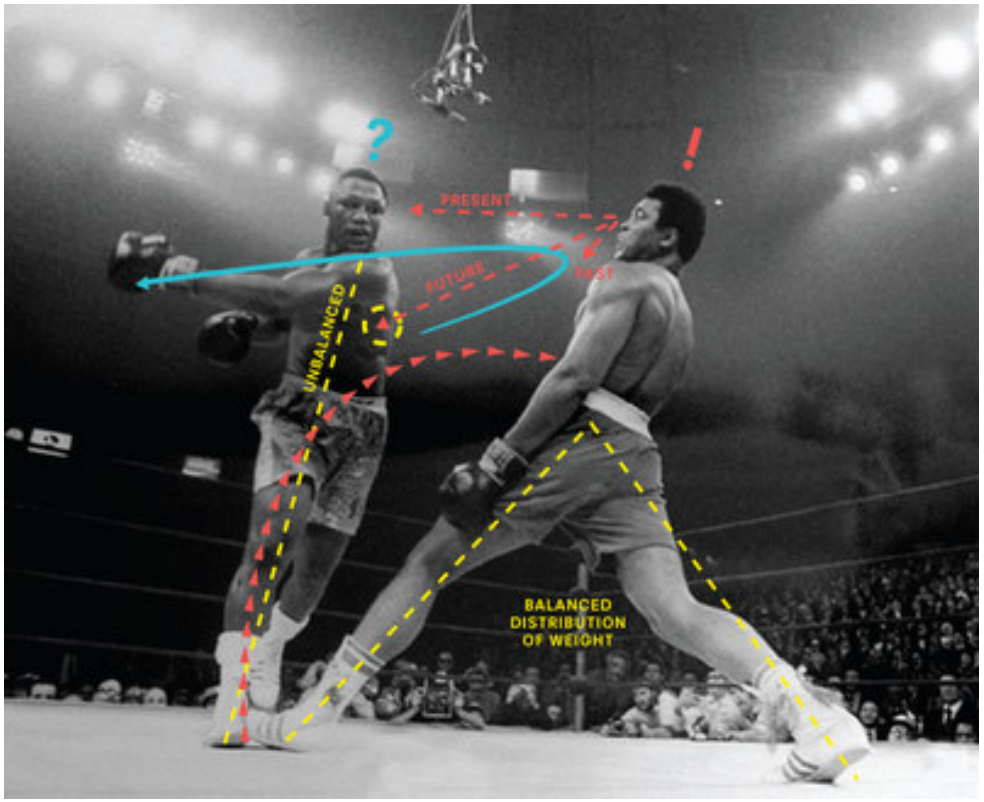
Sport e smartphone nella didattica della Fisica

Nunzio Lanotte



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La Fisica dello sport, Zanichelli 2014

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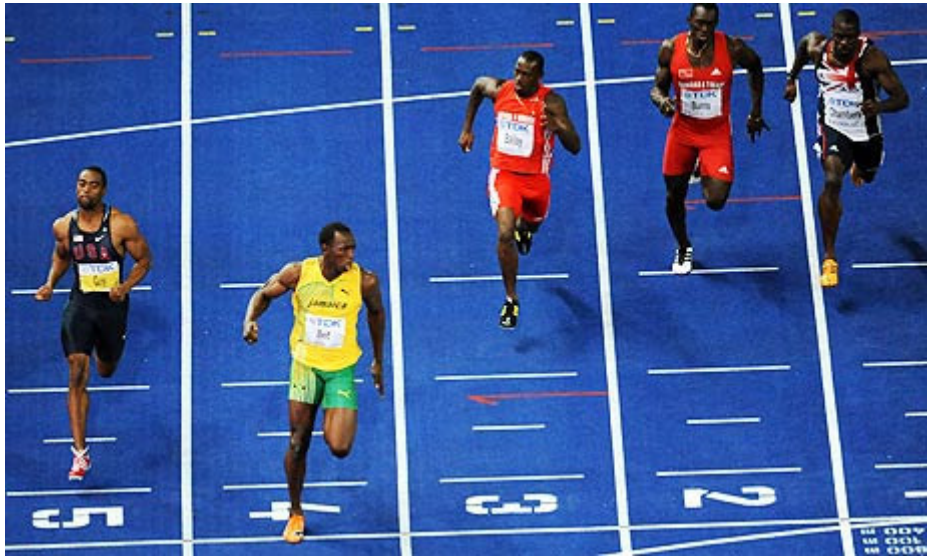
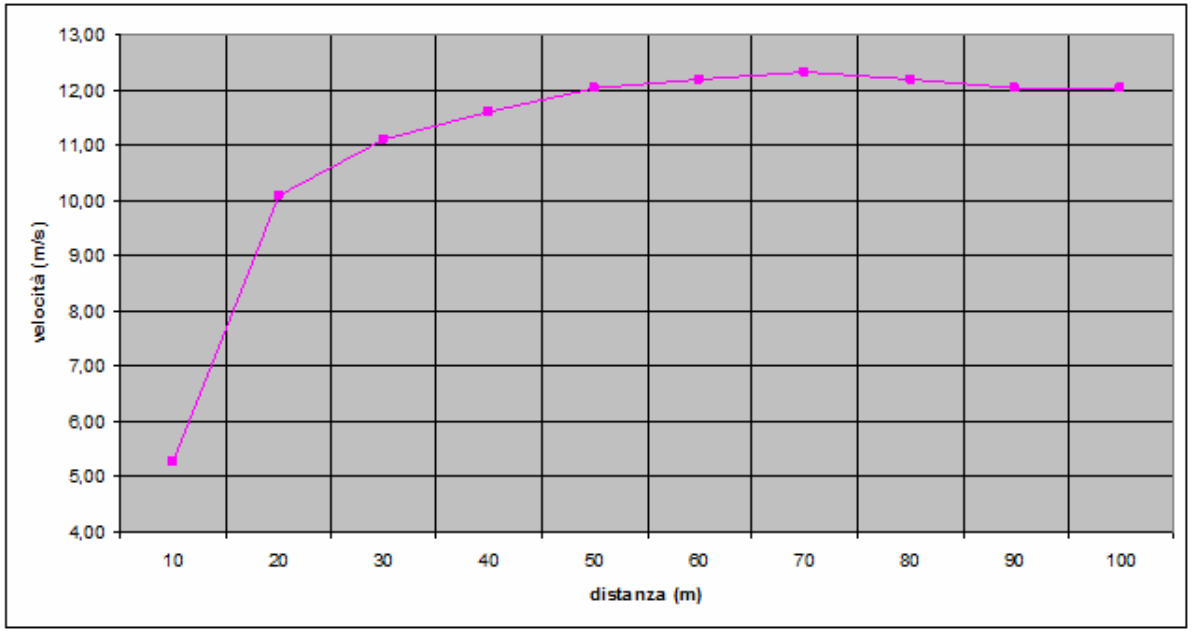
Cinematica: il record di Bolt (1)



t10	t20	t30	t40	t50	t60	t70	t80	t90	t100
1,89	2,88	3,78	4,64	5,47	6,29	7,10	7,92	8,75	9,58

Cinematica: il record di Bolt (2)

Δt10	Δt20	Δt30	Δt40	Δt50	Δt60	Δt70	Δt80	Δt90	Δt100
1,89	0,99	0,9	0,86	0,83	0,82	0,81	0,82	0,83	0,83
v10	**v20**	**v30**	**v40**	**v50**	**v60**	**v70**	**v80**	**v90**	**v100**
5,29	10,10	11,11	11,63	12,05	12,20	12,35	12,20	12,05	12,05



- Elaborazione dati sperimentali
- Creazione di un grafico
- (Uso di Excel)
- Comprensione di concetti (velocità media totale e nell'intervallo Δt, conversione m/s → km/h)

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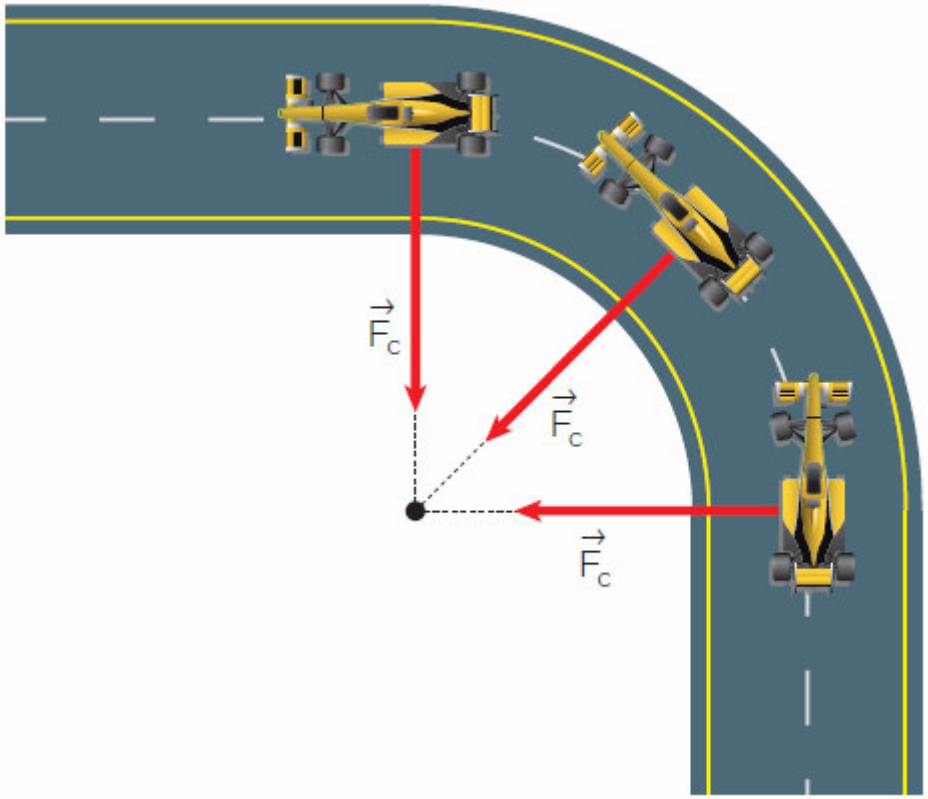
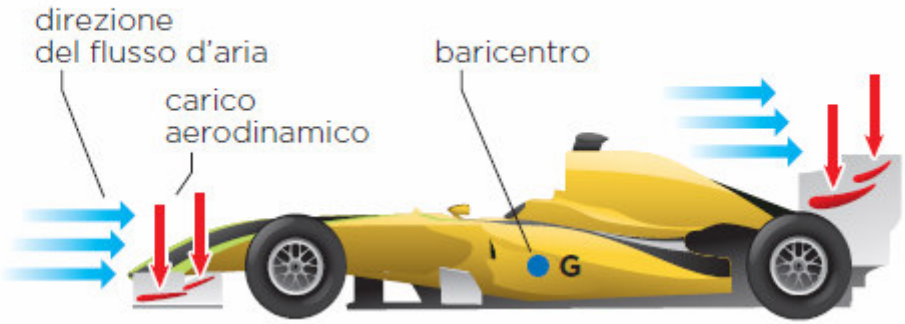
Dinamica: le forze agenti sull'auto da corsa (1)



- Attrito
- Forza centripeta

Dinamica: le forze agenti sull'auto da corsa (2)

$$F_{\perp} = mg + D$$



- G-Force
- Carico aerodinamico

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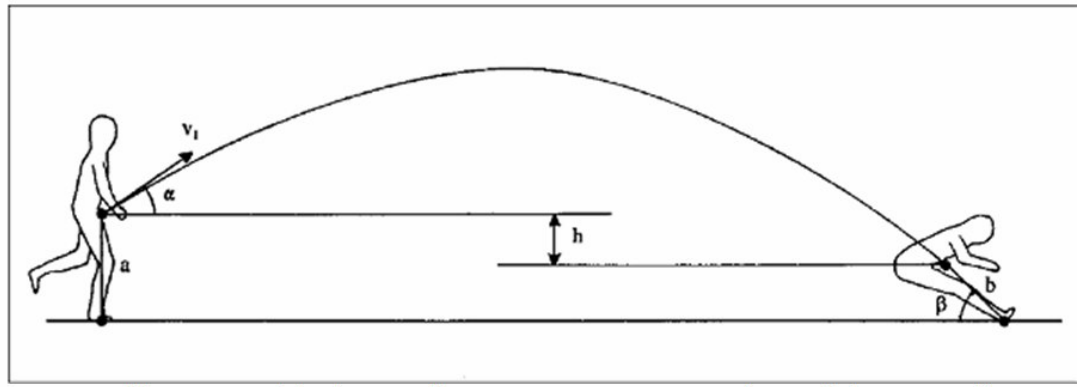
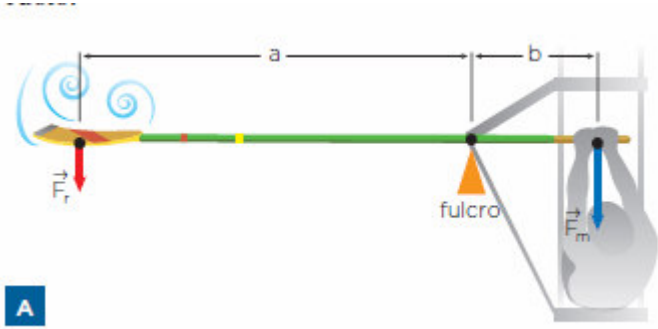
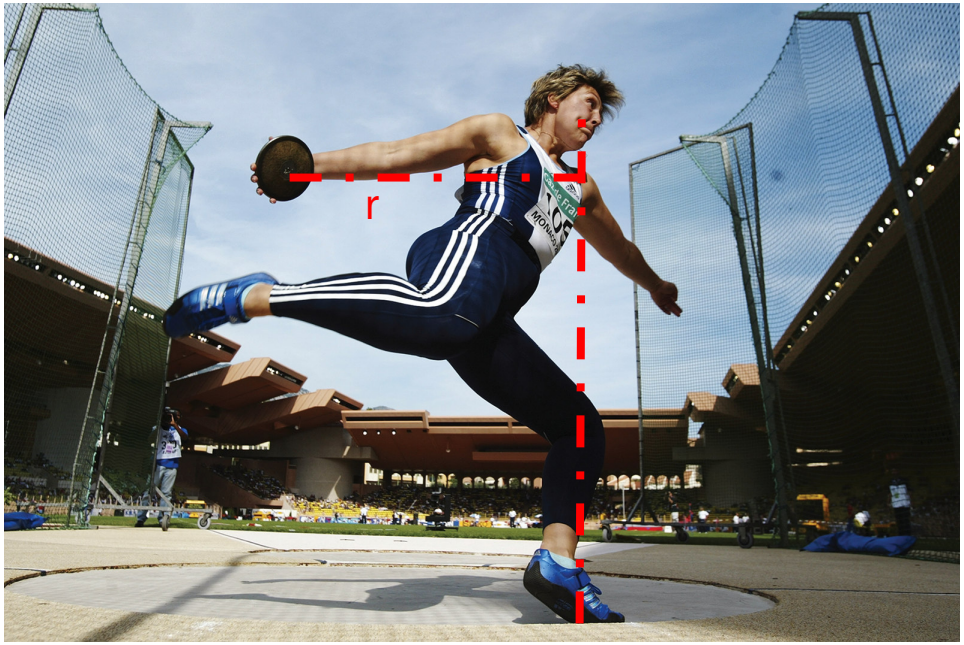
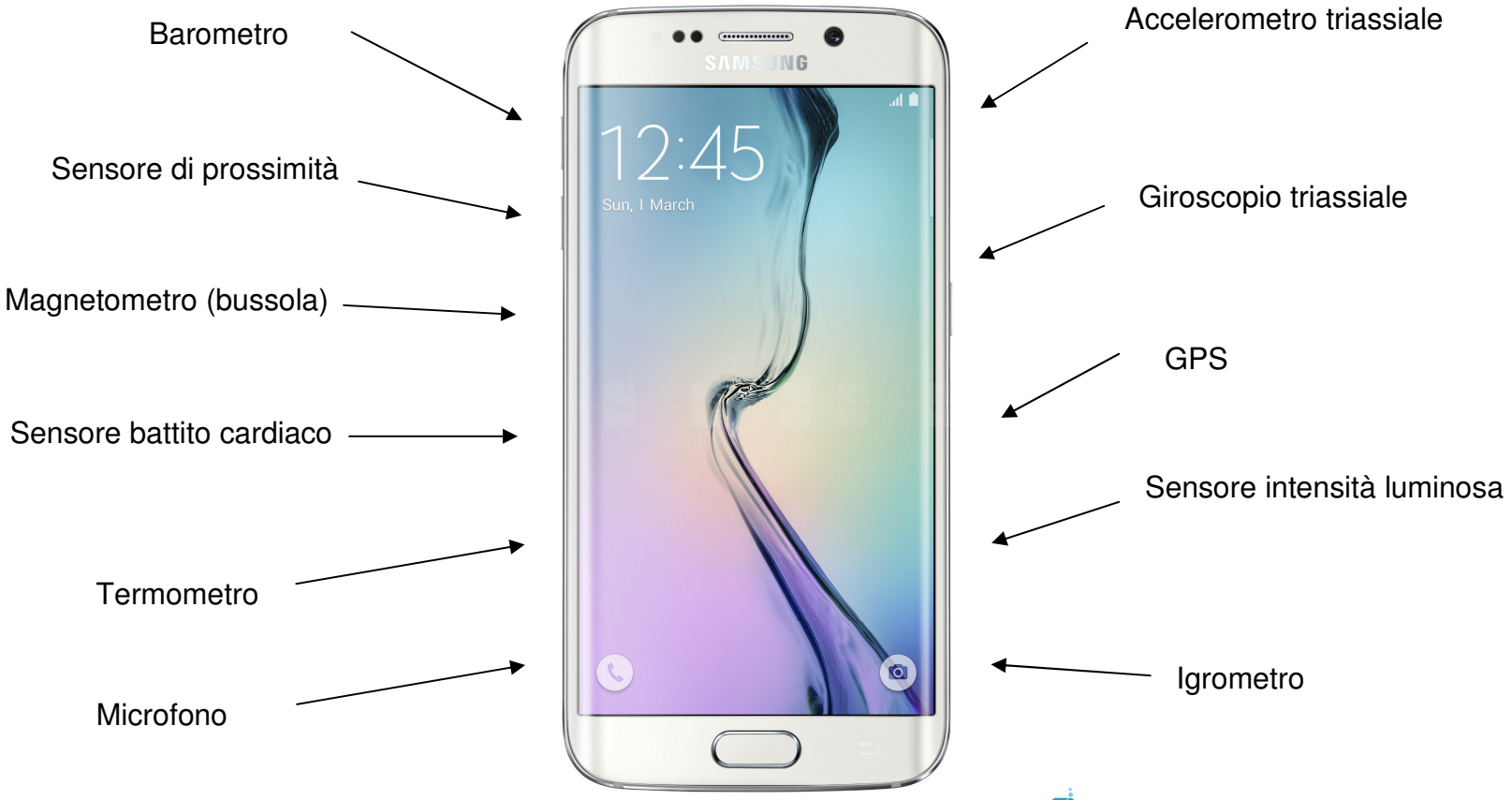
Semplificazioni e modelli



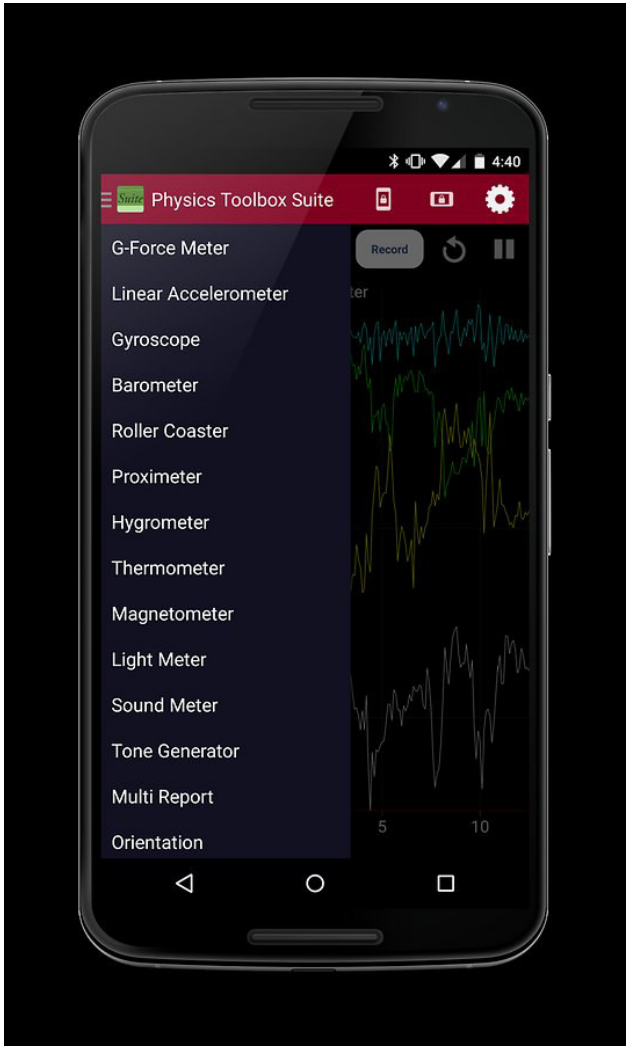




Lo smartphone: un laboratorio in tasca



L’applicazione Physics Toolbox



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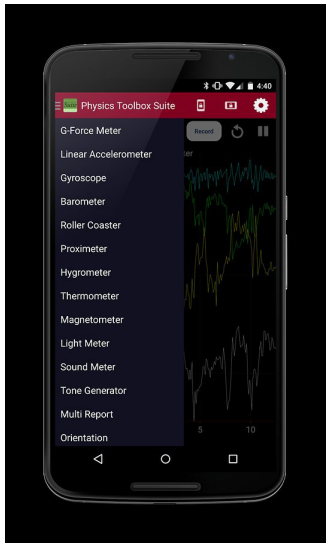
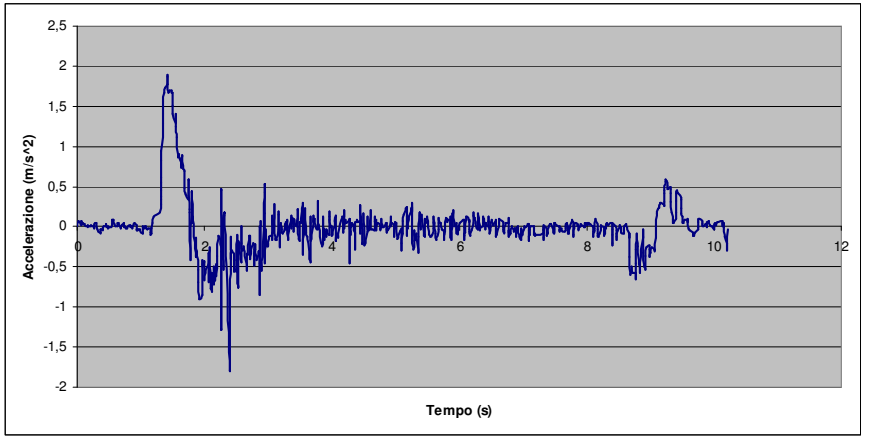
Acquisizione, trasferimento, visualizzazione dei dati





G-Force meter

Misura le accelerazioni, inclusa g. (la funzione accelerometer filtra g)

G-Force= (a+g)/g

Esperimenti su:

- **g**
- **Componenti di vettori**
- **Forze apparenti**

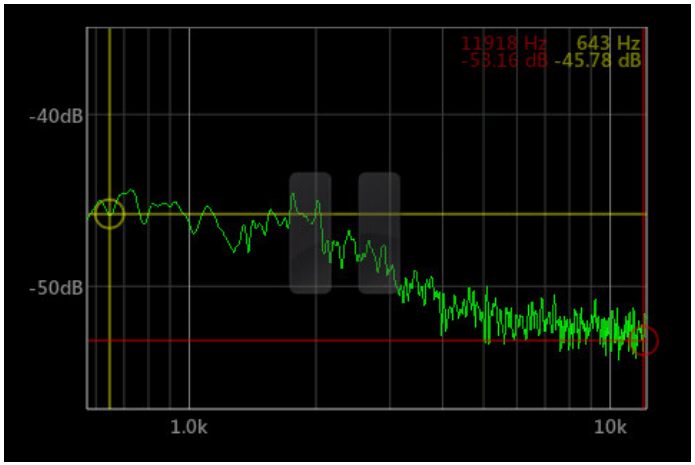
Giroscopio

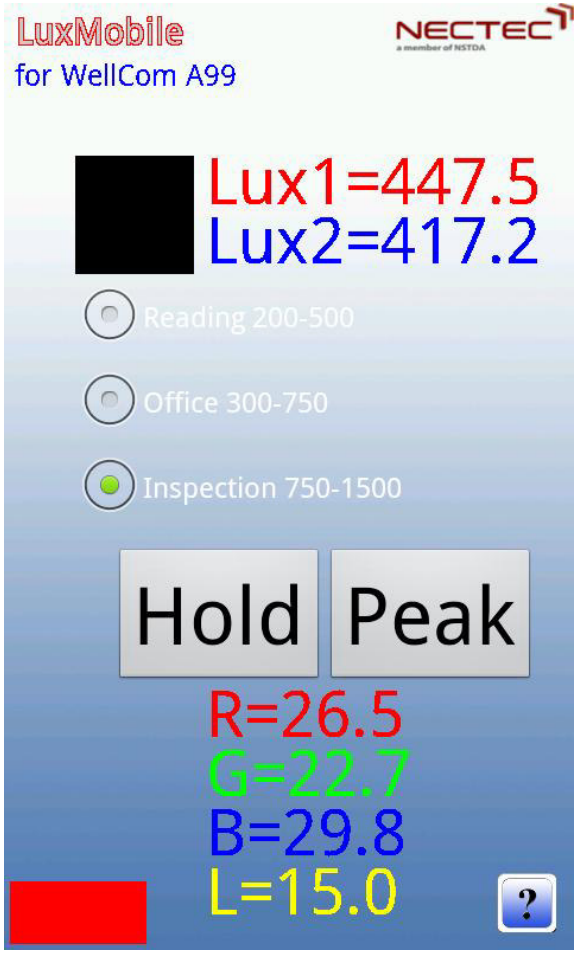
Misura le velocità angolari attorno ai tre assi.

Esperimenti su:

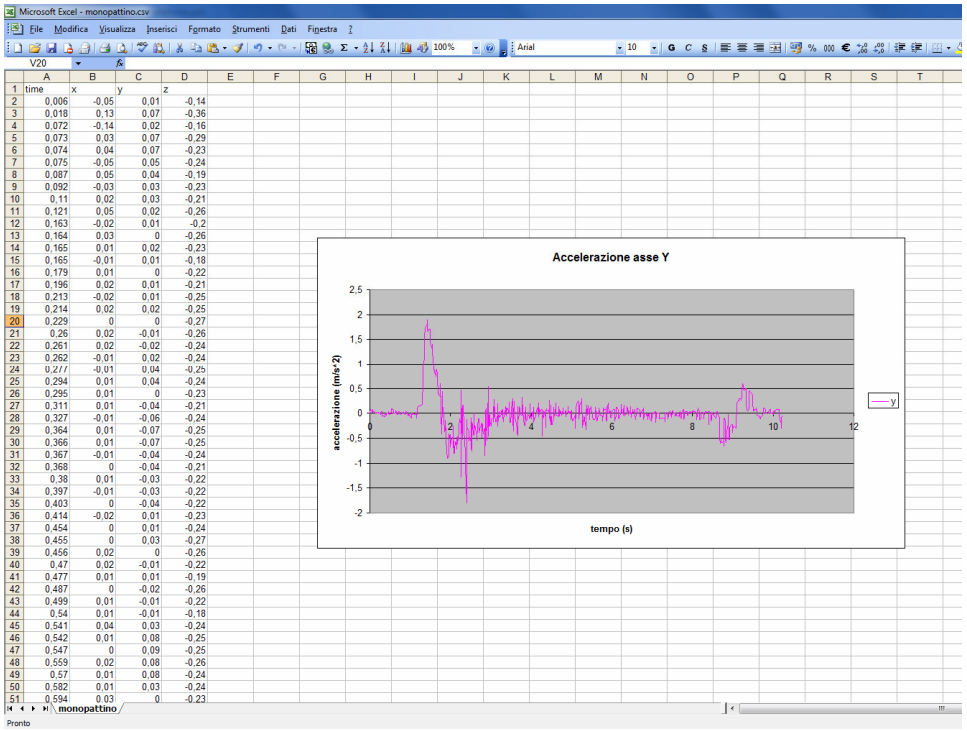
- **Moto circolare**
- **Accelerazione angolare**
- **Moti periodici**

Altre app: GPS, spettro di frequenza, spettro luminoso…



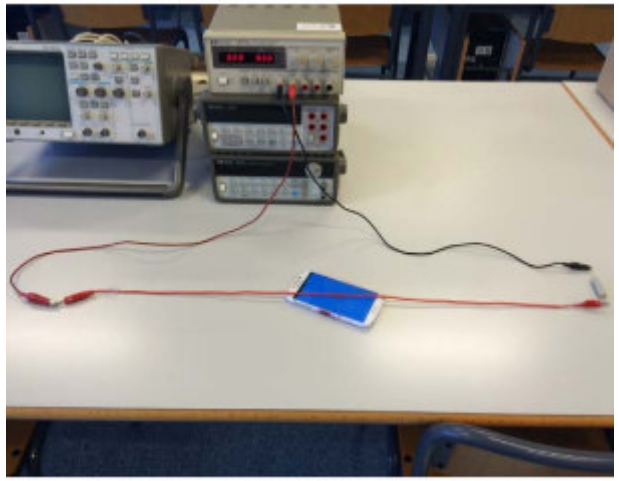


Competenze in gioco



- Uso di strumenti
- Trattamento e analisi dei dati con Excel
- Creazione di grafici
- Medie, dev. st.
- Creazione di report sull'esperimento
- Creazione di mappe
- Uso dell'inglese

Approfondimenti



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Occhio! I ragazzi ne sanno più di noi!