

Inertia Documentation

Introduction / Login

NOTICE: The prior Inertia application has been replaced with an Internet based on-line version.

The application requires a license key to operate, and it can be found at <http://inertia.c-motion.com>

The login screen only requires the license key, which is provided by C-Motion when access to the application is purchased. The license is only saved on the PC as a web cookie for a few hours, so save it carefully to keep running the application.

Inertia: A Mathematical Inertial Model of the Human Body



The screenshot shows a web form for entering a license key. It consists of a text input field with the placeholder text "License Key:" and a blue button labeled "Submit Key" positioned directly below the input field.

Subject Buttons

The Inertia program has two major sections. On the left of the screen is the Subject Data section which allows the user to load and save the subject data that is entered and used on the right side of the screen. Sample data is provided by default. The buttons with subject identifiers (like "Sample Subject") load the data into the form on the right for all 3 data entry tabs. The "Clear Subject Data" button simply clears out the form. The blue "Save" button on the right side will create a cookie and add a button on the left with whatever Name/Identifier you have specified. This lets you load and then modify data as needed.

The import/export sections let you keep your data off-line in comma-delimited text files. Subject data is stored as cookies while you use the application, so saving data can avoid the chore of re-entering the data each time. The application requires that ALL data fields in the first 3 tabs be filled in.

On the right of the screen are a set of three tabs which allow the user to input subject information, subject metrics and retrieve calculated metrics. Hover the mouse over the pointer finger icons to see an illustration of each measurement field.

Inertia: A Mathematical Inertial Model of the Human Body

Subjects*





* Note: Subjects are stored as 3-hour cookies. They will be deleted when expired or when cache is cleared and must be manually saved if you want to keep any subject data.

No file selected.

import/export
cookie data

No file selected.

Legacy file formats

Subject Data

Name/Identifier:

Mass (Kg):

Height (mm):

Density Measures From:

Torso Measures

Arm Measures

Leg Measures

Results

Torso Lengths:

1. Acromion to Hip Center (mm):
2. Acromion to Apex of Head (mm):

Hover for illustrations

Torso Perimeters:

3. Hip Perimeter (mm):
4. Umbilicus Perimeter (mm):
5. Lower Ribcage Perimeter (mm):
6. Chest Perimeter (mm):
7. Neck Perimeter (mm):
8. Head Perimeter (mm):

Torso Widths:

9. Hip Width (mm):
10. Umbilicus Width (mm):
11. Lower Ribcage Width (mm):
12. Chest Width (mm):
13. Shoulder Center Width (mm):

All fields must be filled in for Torso calculations to work. (Use integer numbers only)

Subject Data

The right side of the screen is used to input the measurements that you have taken of a subject.

The fields at the top are critical, and the 3 tabs (Torso, Arms, Legs) are for the input of anthropometric measurements. All fields must be filled in for the calculations to work.

The forth tab shows the resulting inertial properties once you click the "Calculate Inertial Values" button. The export buttons save the results as text files, in the same format(s) as the earlier application.

The pink area at the top is where warning or error messages about the data you've entered. Any system errors appear here too.

Inertia: A Mathematical Inertial Model of the Human Body

Warning: chest perim is large for shoulder width.
 Warning: chest width is small for chest perimeter.
 TORSO chest width modified to 312.58027376557
 Warning: Right arm length #14 is large
 Warning: Left foot length #22 is large
 Warning: Right foot length #22 is large

Subjects*

SAMPLE SUBJECT 

SAMPLE 2 

Clear Subject Data

* Note: Subjects are stored as 3-hour cookies.
 They will be deleted when expired or when cache is cleaned and
 must be manually saved if you want to keep any subject data.

Browse... No file selected.

Import CSV Subjects

Export Subjects (CSV)

Browse... No file selected.

Import a Fortran Subject

Export a Subject (Fortran)

Subject Data

Name/Identifier:

Mass (Kg):

Height (mm):

Density Measures From:

Save Subject Data

Torso Measures Arm Measures Leg Measures Results

Calculate Inertial Values

Export Inertial Values

Export Values to Visual3D

Inertial Head Metrics

Segment Mass (kg):

Distance Proximal Joint to Mass Centre (m):

Segment Length (m):

Frontal Moment of Inertia (kg.m²):

Lateral Moment of Inertia (kg.m²):

Longitudinal Moment of Inertia (kg.m²):

Pelvis Metrics

Segment Mass (kg):

Distance Proximal Joint to Mass Centre (m):

Segment Length (m):

Measurements and Ranges

This application is for use with adults (post-pubescent) and is not intended for use with children.

Mass: need to be able to enter to one decimal place e.g. 75.2 kg

Default: Range

Mass 70: 40 – 130

Standing Height: 1700: 1300 – 2100

HEADING: TORSO LENGTHS

Acromion to Hip Center 550: 400 – 700

Acromion to Apex of Head 270: 170 – 370

HEADING: TORSO PERIMETERS

Hip Perimeter 900: 700 – 1300

Umbilicus Perimeter 800: 500 – 1300

Lower Ribcage Perimeter 800: 500 – 1300

Nipple Level Perimeter 900: 600 – 1200

Neck Perimeter 350: 250 – 500

Top of Ear Perimeter 570: 450 – 700

HEADING: TORSO WIDTHS

Hip Width 350: 200 – 500

Umbilicus Width 300: 200 – 500

Lower Ribcage Width 300: 200 – 500

Nipple Level Width 320: 200 – 500

Shoulder Center Width 350: 250 – 500

HEADING: LEFT ARM LENGTHS

Shoulder to Wrist Center 500: 400 – 650

Wrist Center to Finger End 180: 140 – 250

HEADING: LEFT ARM PERIMETERS

Upper Arm Perimeter 280: 180 – 500

Elbow Perimeter 270: 170 – 400

Max Forearm Perimeter 270: 170 – 400

Wrist Perimeter 170: 120 – 250

Knuckle Perimeter 200: 140 – 300

HEADING: RIGHT ARM LENGTHS

Use same default and ranges as for left arm

HEADING: RIGHT ARM PERIMETERS

Use same default and ranges as for left arm

HEADING: LEFT LEG LENGTHS

Hip to Ankle Center 850: 650 – 1100

Ankle Center to Toe End 200: 150 – 330

HEADING: LEFT LEG PERIMETERS

Crotch Perimeter 600: 300 – 900

Mid-Thigh Perimeter 530: 300 – 900

Knee Perimeter 380: 200 – 600

Max Calf Perimeter 370: 200 – 600

Min Ankle Perimeter 230: 150 – 350

Heel Perimeter 330: 200 – 500

Ball of Foot Perimeter 240: 150 – 350

HEADING: RIGHT LEG LENGTHS

Use same default and ranges as for left leg

HEADING: RIGHT LEG PERIMETERS

Use same default and ranges as for left leg

Fred Yeaton, May 2013

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