**READ ME**

This repository contains the force and displacement data recorded during the experimental session of the paper:

Lamberto, G., Amin, D., Solomon, L. B., Ding, B., Reynolds, K. J., Mazzà, C., & Martelli, S. (2019). Personalised 3D knee compliance from clinically viable knee laxity measurements: A proof of concept ex vivo experiment. Medical engineering & physics, 64, 80-85.

The dataset is organized as a Matlab structure file (.mat). For information on how to access and manage this format, please visit the Matlab help. The structure is hierarchical and accessible by the use of dots across the different levels and names.

The top level defines (See Table 1):

* Specimen ID (i.e. S3, S4)
* Specimen condition (i.e. Intact, Surgery\_1, Surgery\_2, Surgery\_3) – for the order of the cutting sequence please refer to the method section of the paper.
* Flexion angle of testing (i.e. Deg\_0, Deg\_15, Deg\_30, Deg\_60, Deg\_90)

|  |
| --- |
| S3\_\_\_Intact\_\_\_Deg\_0 |
| S3\_\_\_Intact\_\_\_Deg\_15 |
| S3\_\_\_Intact\_\_\_Deg\_30 |
| S3\_\_\_Intact\_\_\_Deg\_60 |
| S3\_\_\_Intact\_\_\_Deg\_90 |
| S3\_\_\_Surgery\_1\_\_\_Deg\_0 |
| S3\_\_\_Surgery\_1\_\_\_Deg\_15 |
| S3\_\_\_Surgery\_1\_\_\_Deg\_30 |
| S3\_\_\_Surgery\_1\_\_\_Deg\_60 |
| S3\_\_\_Surgery\_1\_\_\_Deg\_90 |
| S3\_\_\_Surgery\_2\_\_\_Deg\_0 |
| S3\_\_\_Surgery\_2\_\_\_Deg\_15 |
| S3\_\_\_Surgery\_2\_\_\_Deg\_30 |
| S3\_\_\_Surgery\_2\_\_\_Deg\_60 |
| S3\_\_\_Surgery\_2\_\_\_Deg\_90 |
| S3\_\_\_Surgery\_3\_\_\_Deg\_0 |
| S3\_\_\_Surgery\_3\_\_\_Deg\_15 |
| S3\_\_\_Surgery\_3\_\_\_Deg\_30 |
| S3\_\_\_Surgery\_3\_\_\_Deg\_60 |
| S3\_\_\_Surgery\_3\_\_\_Deg\_90 |
| S4\_\_\_Intact\_\_\_Deg\_0 |
| S4\_\_\_Intact\_\_\_Deg\_15 |
| S4\_\_\_Intact\_\_\_Deg\_30 |
| S4\_\_\_Intact\_\_\_Deg\_60 |
| S4\_\_\_Intact\_\_\_Deg\_90 |
| S4\_\_\_Surgery\_1\_\_\_Deg\_0 |
| S4\_\_\_Surgery\_1\_\_\_Deg\_15 |
| S4\_\_\_Surgery\_1\_\_\_Deg\_30 |
| S4\_\_\_Surgery\_1\_\_\_Deg\_60 |
|  S4\_\_\_Surgery\_1\_\_\_Deg\_90 |
|  S4\_\_\_Surgery\_2\_\_\_Deg\_0 |
|  S4\_\_\_Surgery\_2\_\_\_Deg\_15 |
|  S4\_\_\_Surgery\_2\_\_\_Deg\_30 |
|  S4\_\_\_Surgery\_2\_\_\_Deg\_60 |
|  S4\_\_\_Surgery\_2\_\_\_Deg\_90 |
|  S4\_\_\_Surgery\_3\_\_\_Deg\_0 |
|  S4\_\_\_Surgery\_3\_\_\_Deg\_15 |
|  S4\_\_\_Surgery\_3\_\_\_Deg\_30 |
|  S4\_\_\_Surgery\_3\_\_\_Deg\_60 |
|  S4\_\_\_Surgery\_3\_\_\_Deg\_90 |

Table 1 – Top level of the dataset.

By entering the second level named SI, it is possible to access to the different tests performed (see Table 2), which are:

* Lachman test named as loadcontrol\_Ty
* Pivot Shift test named as loadcontrol\_Rz\_Ry
* Sequence of position controlled tests in the different degrees of freedom:
	+ Tx – LM direction
	+ Ty – AP direction
	+ Tz – PD direction
	+ Ry – AA rotation
	+ Rz – IE rotation
* Notes: \_L contains linear (mm) and angular (˚) displacements, \_F contains forces (N) and moments (Nmm)
* Data format of the matrices:
	+ Columns: experimental frames re-sampled using spline interpolation
	+ Rows: linear and angular displacements, or forces and moments in the order: AP, PD, LM, AA, IE, and FE.

For example, to get the force and moment matrix related to specimen S3, tested as intact condition at 30˚ during a simulated Pivot Shift test, it will be necessary to type this in Matlab:

DatasetPaper.S3\_\_\_Intact\_\_\_Deg\_60.SI.loadcontrol\_Rz\_Ry\_F

|  |
| --- |
|  loadcontrol\_Rz\_Ry\_L |
|  loadcontrol\_Rz\_Ry\_F |
|  loadcontrol\_Ty\_L |
|  loadcontrol\_Ty\_F |
|  nRy\_L |
|  nRy\_F |
|  nRz\_L |
|  nRz\_F |
|  nTx\_L |
|  nTx\_F |
|  nTy\_L |
|  nTy\_F |
|  nTz\_L |
|  nTz\_F |
|  pRy\_L |
|  pRy\_F |
|  pRz\_L |
|  pRz\_F |
|  pTx\_L |
|  pTx\_F |
|  pTy\_L |
|  pTy\_F |
|  pTz\_L |
|  pTz\_F |

Table 2 – Naming convention of the different test performed.