Detaillierte Testergebnisse für Testdurchlauf 1

1. Tool Calibration Error [ID: 312684]

Which of the following is not a possible source of tool calibration error?

- ○ Tool tracking error during pivoting.
- ○ Error in the tracking of a calibration device.
- ○ Movement of a tool within a calibration device while digitising its location.
- ◉ Error in the translation between the tool tracking marker and the tool tip.
- ○ Tool not fully inserted into calibration device during position digitisation.
- ○ Tool tip translations during pivoting.

2. Mitigating Calibration Errors in Non-rigid Surgical Instruments [ID: 312688]

If your surgical instrument is non-rigid, your calibrated tool tip position, p_t, will experience error when the tool bends. How can you overcome this issue?

- ◉ Track the tip of the tool using electromagnetic tracking.
- ○ Calibrate the tool just prior to use.
- ○ Track the tip of the tool using passive optical infrared tracking.
- ○ Track the tip of the tool using active optical infrared tracking.
- ○ Calibrate the tool prior to patient-to-image registration.

3. Tool Calibration Equations [ID: 312682]

Which equation does not express the tip of the pointer in the tracking coordinate system (according to the nomenclature of the Tool Calibration assignment description)?

- ○ $p_{camera} = ^{camera}T_{tool} \cdot (^{tool} T_{tip})^{-1} \cdot p_{tip}$
- ○ $p_{camera} = ^{camera}T_{reference} \cdot ^{reference} T_{tip} \cdot p_{tip}$
- ◉ $p_p = R_i \cdot p_t + p_i$
- ○ $p_{camera} = ^{camera}T_{tip} \cdot p_{tip}$

4. Singular Value Decomposition [ID: 312678]

SVD can be used to solve the overdetermined equation of the form $Ax=b$ by rewriting it in the form $U \Sigma V^T x=b$. Which statement is not correct?

- ○ The pseudoinverse of A, A^+, equals $U \Sigma^{-1} V^T$
- ○ $x = V \Sigma^{-1} U^T b$
- ◉ Σ is an $n \times n$ diagonal positive real matrix
- ○ The pseudoinverse of A, A^+, equals $V \Sigma^{-1} U^T$
- ○ $A=U \Sigma V^T$

5. Scenarios Exempting Tool Calibration in Computer Assisted Surgery [ID: 312690]

When is tool calibration not a required process for a computer assisted surgery?

- ○ When active optical tracking is used.
- ○ When the tool is rigid.
- ◉ When the translation from the tracked location on the instrument and the tool tip is known and unchanging.
- ○ When the patient is also being tracked by the tracking system.
- ○ When the tracking marker is applied to the instrument in the operating room.

6. Function Output in Tool Calibration Assignment [ID: 312692]

What does the *calibration_device_calibration* function compute in the tool calibration function of the Tool Calibration assignment?

- ○ It computes the transformation from the tool coordinate system to the camera coordinate system.
- ◉ It computes the position of the tool tip in the camera coordinate system using transformations from the calibration device.
- ○ It computes the position of the tool tip in the tool coordinate system using transformations from the camera and calibration device.
- ○ It computes the transformation from the camera coordinate system to the tool coordinate system.

7. Solving an overdetermined system of linear equations [ID: 312680]

Why is the pseudoinverse required to solve an overdetermined system of linear equations of the form $Ax=b$?

- ○ Because only b is a square matrix
- ○ Because x is a diagonal matrix
- ◉ Because A is a non-square matrix
- ○ Because only A is a square matrix

8. Pivoting Calibration: Degrees of Freedom [ID: 312686]

Which degrees of freedom (DoF) can you calibrate with pivoting?

- ○ 2 translational DoF.
- ○ All DoF.
- ○ 3 translational DoF and 3 rotational DoF.
- ○ 2 rotational DoF.
- ◉ 3 rotational DoF.
- ○ 3 translational DoF.