Robotics I - Sheet for Exercise 2

January 11, 2018

Name: _____

Consider the basic algorithms of the two main numerical methods used for solving inverse kinematics problems, denoted here as **N** (Newton method) and **G** (Gradient method). Check if each of the following statements is **True** or **False**, and provide a *very short* motivating/explanation sentence.

1. **N** and **G** always fail at singularities.
   True [ ]   **False** [ ]

   _____

2. **G** stops when a singularity is encountered.
   True [ ]   **False** [ ]

   _____

3. Out of singularities, **N** finds always a solution faster than **G**.
   True [ ]   **False** [ ]

   _____

4. **N** can be used only when there is a single global solution to the problem.
   True [ ]   **False** [ ]

   _____

5. Both **N** and **G** need knowledge of the analytic Jacobian of the task.
   True [ ]   **False** [ ]

   _____

6. For a non-square Jacobian, the pseudoinverse should replace the Jacobian transpose in **G**.
   True [ ]   **False** [ ]

   _____

7. Close to a solution, it is computationally faster to evaluate an iteration of **N** than one of **G**.
   True [ ]   **False** [ ]

   _____

8. **G** works better for linear problems, **N** for quadratic ones.
   True [ ]   **False** [ ]

   _____

9. Neither **N** nor **G** would terminate without the use of a small tolerance on the final error.
   True [ ]   **False** [ ]

   _____

10. Beside matrix operations with the Jacobian and the error, **G** needs an extra choice to be made.
    True [ ]   **False** [ ]

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