TÉCNICO LISBOA

Institute for Systems and Robotics | LISBOA

Modeling Eye-Head System

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LARSyS Laboratory of Robotics and Engineering Systems

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VISLAB

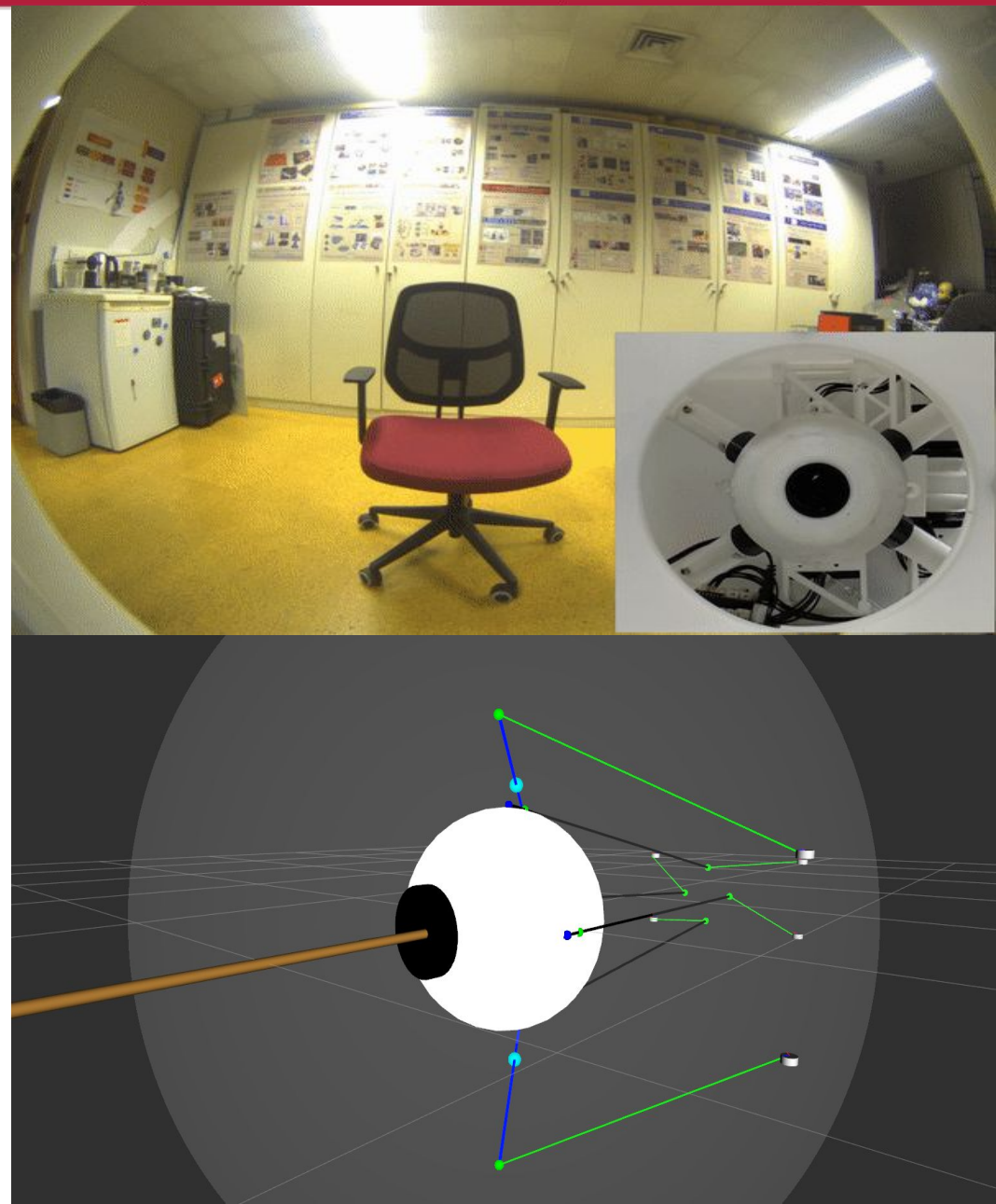
Objectives

- Expansion of the previous simulator, with 6 independent muscles rotating the eye;
- Model head and neck;
- Implementing a better muscle model, making them wrap around the eye (José and Ricardo);

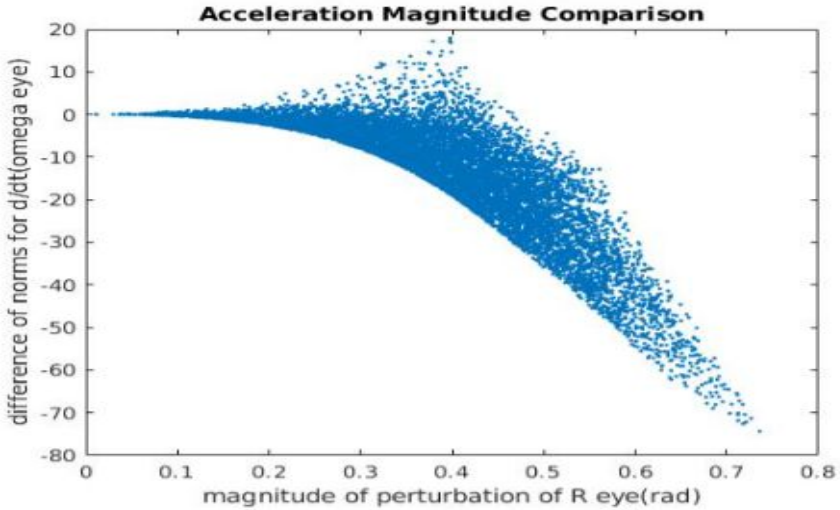
Previously

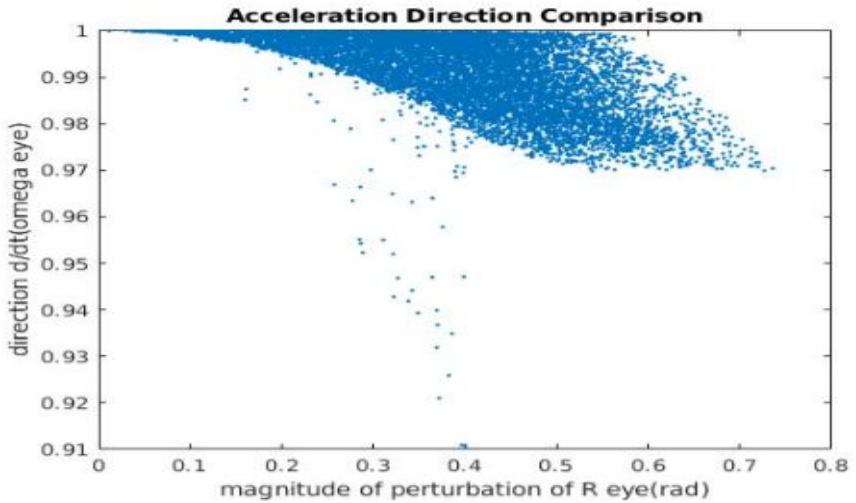
Developed:

- Biomimetic eye model
- Analytical linearization
- Control strategies to account for the eye system redundancy



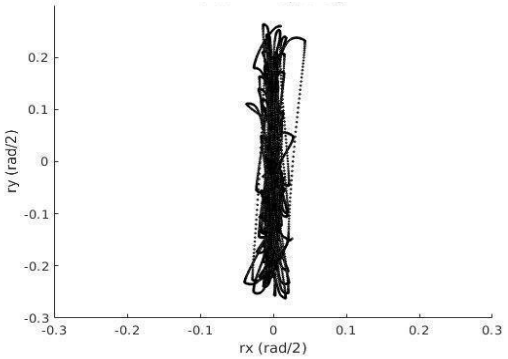
Results



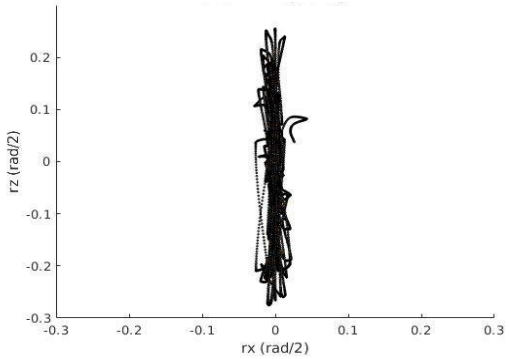


- Comparison between the linear and nonlinear systems for 10000 orientations

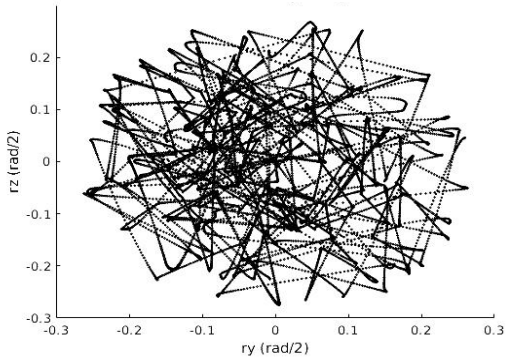
Trajectory



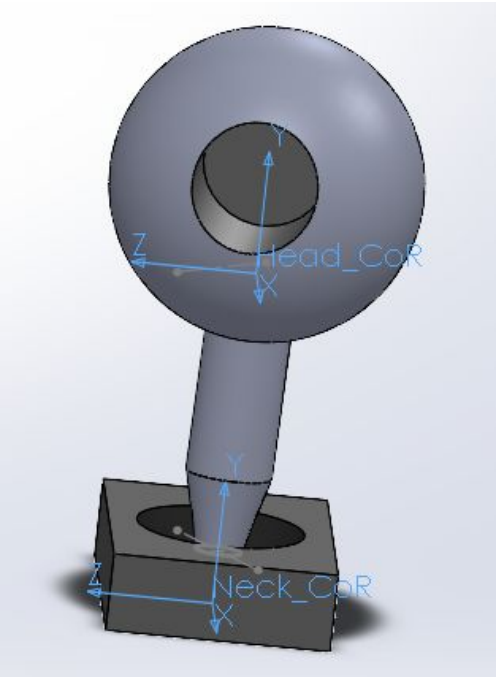
Trajectory



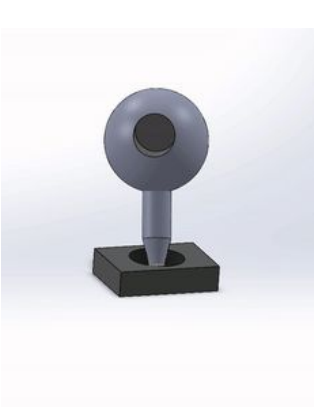
Trajectory



- Throughout the trajectory, system respected Listing's law



Head and Neck coordinate systems

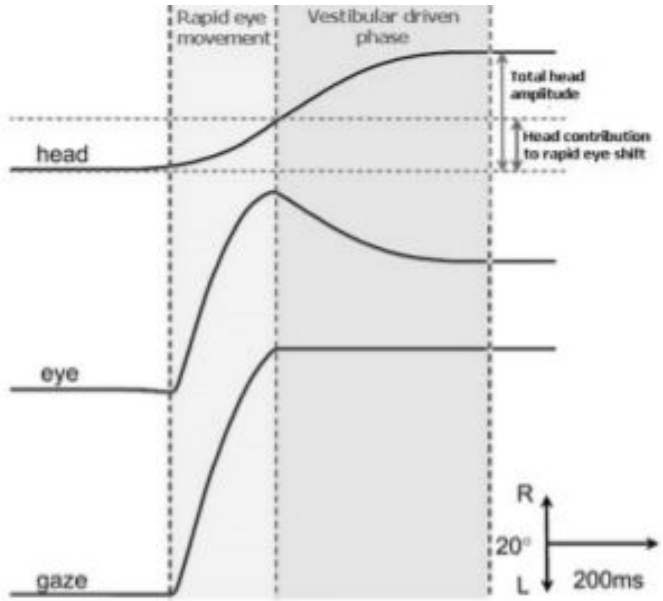


New eye-head model

- 4 Degrees of rotational Freedom (3 for neck, 1 for the head);
- Simplified number of muscles ;

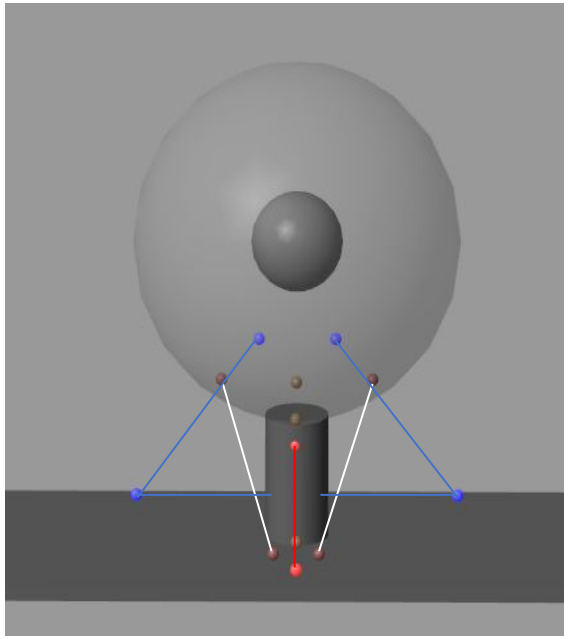
Challenges

- Neck makes the eye and head translate;
- Implementing eye-head coordination;

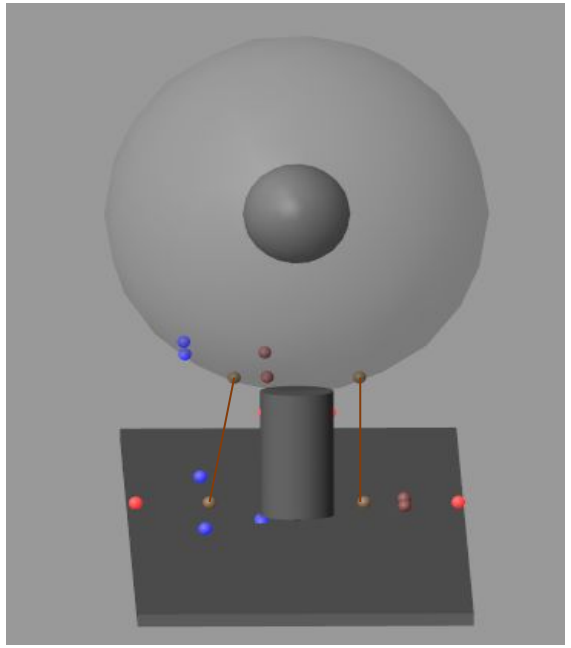


Eye and head movements for a 50° horizontal saccade

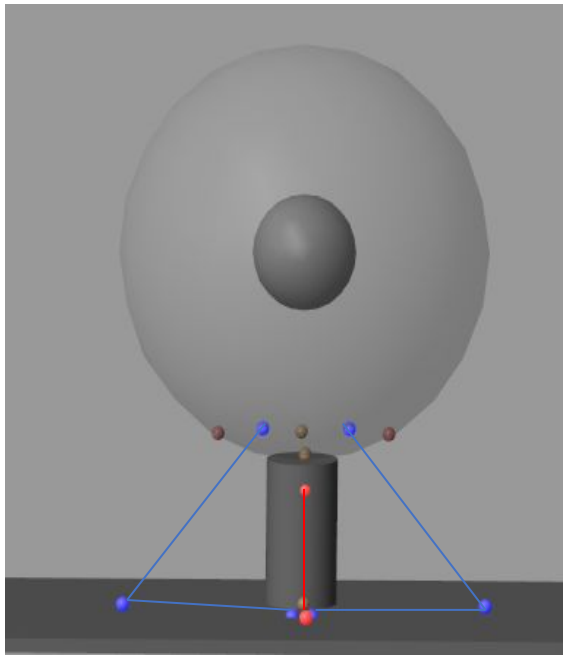
Insertion Points



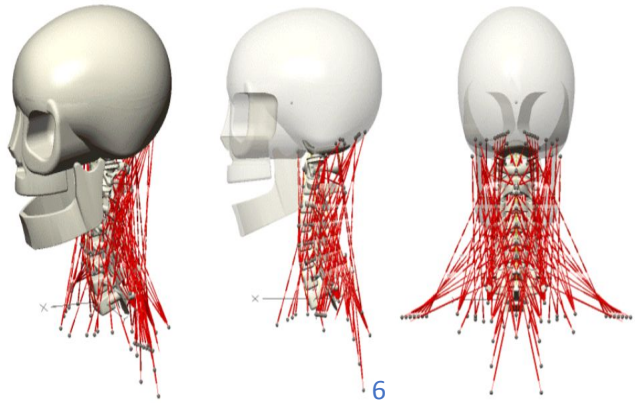
Front View

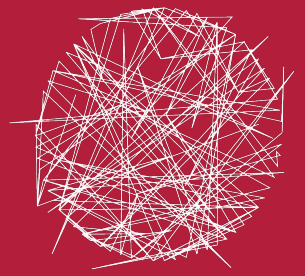


Side View



Rear View





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Thank you!

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