Autonomous Vehicle Simulation (AVS) Laboratory, University of Colorado

Basilisk Technical Memorandum

Document ID: Basilisk-saturate

SATURATE UTILITY

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Status: Tested
Scope/Contents
The Basilisk Saturate utility saturates (or "rails") a given state vector based on user input bounds.

Rev	Change Description	By	Date
1.0	First draft	S Carnahan	20180116

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1 Model Description

The saturate utility bounds states at levels set by users. It takes in n-dimensional state vectors and 2 x n dimensional state bounds (high and low).

2 Model Functions

The Gauss Markov functions are:

- **Set bounds**: Sets the upper and lower bounds to saturate at.
- **Saturate**: Saturates the given state.

3 Model Assumptions and Limitations

- **Reasonable Bounds**: The utility has no checking for inverted bounds, NaNs, or any other way the user may improperly use it.

4 Test Description and Success Criteria

This test is located at `src/simulation/utilitiesSelfCheck`.

4.1 Test Descriptions

1. Saturate A 3-vector is tested such that one element is railed low, one railed high, and one left alone.

5 Test Results

All test results below

Table 2: Test results

Test	Pass/Fail
All Tests	PASSED

6 User Guide

For the best examples of the using the Saturate utility, please see the IMU unit test and .cpp files. For other examples, see the coarse sun sensor.