

1125-92-2003      **Mette S Olufsen\*** ([msolufse@ncsu.edu](mailto:msolufse@ncsu.edu)), NC State University, Raleigh, NC 27502. *Modeling control of cardiovascular dynamics during Head-up tilt*. Preliminary report.

The Head-up tilt (HUT) test is commonly used to assess the body's ability to control blood pressure and heart rate. The test starts with the subject lying in supine position, after steady state heart rate and blood pressure signals have been acquired, the subject is tilted head up for about 20-40 min. This test is commonly applied to subjects who have problems controlling blood pressure resulting in syncope following the tilt. Most commonly, HUT data are analyzed manually to determine which tilt etiology best fits the given patient. In this study, we show how modeling can be used to distinguish the various syncope etiology, focus will be on predicting patterns from patients with postural tachycardia (POTS) and cardio-inhibition. The first disease type can be studied changing one parameter in the heart rate control equation causing a switch similar to the one found in a Hopf bifurcation. The second response is observed by flipping one control from negative to positive feedback representing mimicking by action caused by the Bezold Jarish reflex. We also include more general analysis discussing impact of inhibiting either sympathetic or parasympathetic controls. Finally we show that adding noise to predictions of heart rate makes the model resemble data closely. (Received September 19, 2016)