CAP5416: Midterm Exam II
Sample midterm

15th November 2001

The most likely scenario at this point are two questions, one on stereo and one on motion. Each question will have many parts.

1. **Stereo:** Main subject areas are correspondence and reconstruction. Some possible questions are: a) Give examples of surfaces and orientations for which the order of the corresponding points undergoes mirror symmetry. That is, as you scan from left to right in the left image, the corresponding points show up in a right to left scan order in the right image. However, for other surfaces, the scan order is preserved. b) Finite fixation point. If the fixation point is not taken to be infinity, can you show that disparity can increase with depth. c) Write down the equation of the left and right epipolar lines in the corresponding camera coordinate system. d) Derive 7.24 from scratch. e) Describe qualitatively how reconstruction up to a scale factor is achieved when only the intrinsic parameters are known. f) Work out 7.23 for lines.

2. **Motion:** Main subject areas are motion field and optical flow. Some possible questions are: a) Why is there no interaction between translation and rotation components in the motion field. b) Show that multiple foci of expansion and contraction are related to multiple moving objects. c) Non-uniqueness of the motion field. Show this. d) Does the instantaneous epipole depend on the camera's intrinsic parameters. Discuss. e) What is the main difference between optical flow and the motion field. f) Algorithmic question on optical flow computation.