

May 17, 2016

### **Movement generation by humans and robots: Essay (due June 2, 2016)**

Read the chapter "Embodied Neural Dynamics" by Schöner, Faubel, Dineva, and Bicho, available on the course web page. This is from the book "Dynamic Field Theory — A Primer" published by Oxford University Press this year.

In response to each question posed below, write a short essay, that is, a self-contained text that can be read without having read the question. Make sure you deliver to the reader all information necessary to appreciate the point you are making. Take the reader step by step through your argument. Use illustrations that you label and explain so that they can be understood without going back to the source. Finish each point with a short conclusion.

Do not quote literally from sources, and indicate the source of illustrations.

A typical volume of the essay is about 10 pages, but the size varies with how concise you are. Given the same contents, shorter is better.

If several of you collaborate, each must deliver his or her own text. Identical formulation of pieces of the essay is considered fraudulent.

1. Around Figure 4.4., explain the notion of bistability and discuss what bistability offers to the problem of action or goal selection.
2. Figure 4.10 illustrates the notion of bistability for target selection at the level of a neural field. Discuss this form of selection and contrast it with selection as it happens in Figure 4.4. Connect to Figure 4.16.. What would happen, if the decision in Figure 4.16. was done in the style of Figure 4.4.
3. Which sensory measurements are the field dynamics illustrated in Figures 4.9 to 4.12 based on? How many sensory estimate enter the field? How is it possible that the field estimates the heading direction of a target with better precision than the sampling of heading direction by the microphones suggests?
4. Write down in one paragraph at least one point that you now understood better than in the lectures.
5. Formulate at least one question you have about the Chapter. This can be a question of clarification, of generalization, or of criticism.

Bonus There is a mistake in Figure 4.2. as you go from the top to the second from top panel. Can you identify the mistake.