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P S Krishnaprasad*, Department of Electrical and Computer Engg, University of Maryland,
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R. L. Bishop pointed out that there is a natural way to frame a curve. The associated frame equations, analogous to the Frenet-Serret equations, can be viewed as a control system on a Lie group, with natural curvatures as controls. Here we show how certain feedback laws specifying interaction of two or more curves via their curvatures produce coherent patterns of movement of systems of particles. We then proceed to show that in contrast to such a cooperative setting, one can also consider situations of conflict (e.g. predator-prey interactions, territorial combat, in biological settings). Novel interaction laws for these settings appear to capture some observed spatial patterns in nature associated to stealth strategies. This is joint work with Eric Justh. (Received September 27, 2005)