Sync or Swim: A Particle Model of the Interactions within Fish Schools

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Animal aggregates are groupings of coupled animals that behave in a synchronized manner, such as flocks, herds, schools, and swarms. Flocks and schools are particularly interesting because the synchronization is not due to a leader. Instead, each animal in the aggregate follows instinctual "rules" about movement in relationship with each other and external animals and objects. We model the movement of a school of fish using attraction-repulsion forces between fish and targets and obstacles. Leveraging parallel processing on graphics cards, we created an algorithm in C that simulates the movement and synchronization of schools of fish.