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Solution of the Initial-Value Problem of a Fractional Differential Equation

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In a preceding report, a method is presented to give the solution of the initial-value problem of a fractional differential equation, when the initial values are the values of the function and its integer-order derivatives. It is shown that the solution is obtained in a less restricted condition. The discussions here are restricted to linear equations with constant coefficients, which can be solved with the aid of the Laplace transform. Main discussions are given when we adopt the Riemann-Liouville fractional derivative, and some comments are added when we use the Caputo derivative or its modification.

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Mechanism for the partial synchronization in coupled logistic map

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We investigate the dynamical mechanism for the partial synchronization in three coupled one-dimensional maps. A completely synchronized attractor on the diagonal becomes transversely unstable via a blowout bifurcation, and then a two-cluster state, exhibiting on-off intermittency, appears on an invariant two-dimensional plane. If the two cluster state becomes transversely stable, then a partial synchronization may occur on the invariant plane. Otherwise, total desynchronization takes place. It is found that the transverse stability of the two-cluster state may be determined through the competition between its laminar and bursting components. When ``transverse strength'' (i.e., a weighted transverse Lyapunov exponent) of the laminar component is larger (smaller) than that of the bursting component, a partially synchronized (totally desynchronized) attractor appears through the blowout bifurcation.