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论文

多延时互耦合半导体激光器的实时混沌同步特性

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摘要:

针对双延时和三延时互耦合半导体激光器系统,研究了互耦合延时和互耦合强度对实时混沌同步质量的影响,提出了双延时互耦合系统中可将其中一个互耦合延时看作反馈延时的思想,揭示了多延时互耦合半导体激光器系统实时混沌同步条件和规律.研究结果表明,多延时互耦合系统中,某两条双向链路的互耦合延时比值为2,是实现高品质实时混沌同步的基本条件;增大互耦合强度,可以改善实时混沌同步品质,且在较低的等效耦合强度条件下,双延时互耦合系统较三延时互耦合系统更易于实现良好的实时混沌同步.

关键词: 半导体激光器 实时混沌同步 延时互耦合 耦合延时比

Properties of Isochronal Chaos Synchronization of Semiconductor Lasers with Multiple Mutual Time-delayed Couplings

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Abstract:

Based on systems of semiconductor lasers with two mutual time-delayed couplings and three mutual time-delayed couplings, the influence of coupling delays and coupling strength to isochronal chaos synchronization was numerically studied. A thought that one coupling delay could be seen as feedback delays was presented in the system with two mutual time-delayed couplings. The condition and law for isochronal chaos synchronization was revealed in the system of semiconductor lasers with multiple mutual time-delayed couplings. The results show that the ratio 2 of two coupling delays is a basic condition to achieve isochronal chaos synchronization with high quality. Increasing coupling strength can improve the quality of isochronal chaos synchronization, and when the coupling strength is lower, the system with two mutual time-delayed couplings is much easier to achieve good isochronal chaos synchronization than system with three mutual time-delayed couplings.

Keywords: Semiconductor laser Isochronal chaos synchronization Mutual time-delayed couplings Ratio of coupling delays

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