

论文

改进遗传算法在环锤式破碎机动平衡中的应用

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摘要:

环锤式破碎机由于初始制造装配不均或使用后发生了矿物磨损或粘结等原因使锤头质量发生了不平衡, 因而严重影响了环锤式破碎机的动平衡。该现象不但降低设备的工作效率, 同时会使振动现象加剧, 加速系统中轴承的磨损, 使一些零件松动乃至造成疲劳损伤, 从而导致设备瘫痪。针对环锤式破碎机锤头磨损后出现的动不平衡问题, 以转子系统两平衡面所受的不平衡力之和最小, 和两平衡面所受的不平衡力之差最小为原则, 提出一组多目标优化函数, 运用改进的遗传算法为磨损后的锤头找到一种更为合理的新组合方式。其结果表明, 该方法既解决了破碎机转子系统的不平衡问题, 又增加了锤头的使用周期。最后对优化前后的结果进行了转子不平衡响应对比, 验证所得到的结果的合理性。

关键词: 环锤式破碎机; 多目标优化; 遗传算法; 不平衡响应

Application of improved Genetic Algorithms in dynamic balancing of wreath hammer crusher

Abstract:

The hammer mass of wreath hammer crusher is unbalanced as the result of initial asymmetrical in manufacture and assembling or mineral abrasion and bond of hammer after be used, it seriously impacts the dynamic balance of wreath hammer crusher. The phenomenon not only reduces the work efficiency of equipment, but also intensifies the vibration phenomenon, accelerating attrition of bearings in equipment, loosening some of components even causing fatigue damage, finally leading the breakdown of equipments. To solve the dynamic imbalance problem of the wreath hammer crusher caused by the abrasion of hammer, in the paper a set of multi-objective optimization function was put forward, with the principle of the sum of unbalanced force of two dynamic balanced faces was minimal and the difference of unbalanced force of two dynamic balanced faces was minimal. Apply improved genetic algorithm to attrited hammer to find a more reasonable combination to solve the dynamic imbalance of crusher rotor and increase the use cycle of the hammer. At last make a unbalanced response comparison between the optimization results and before, obtain the rationality of results.

Keywords: ring hammer crusher; multi-objective optimization; Genetic Algorithm; unbalance response

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