offset and frequency of movement and to smoothly modulate the generated oscillations according to changes in these parameters. Thus, in order to achieve the desired head movement, opposed to the one induced by locomotion, it is necessary to appropriately tune the CPG parameters. Since this is a non-linear and non-convex optimization problem, the tuning of CPG parameters is achieved by using a global optimization method. The genetic algorithm searches for the best set of parameters that generates the head movement in order to reduce the head shaking caused by locomotion. Optimization is done offline according to the head movement induced by the locomotion when no stabilization procedure was performed. In order to evaluate the resulting head movement, a fitness function based on the Euclidian norm is investigated. Moreover, a constraint handling technique based on tournament selection was implemented. Experimental results on a simulated AIBO robot demonstrate that the proposed approach generates head movement that reduces significantly the one induced by locomotion.

01376

Algorithmic strategies for the recognition of graphs with convex quadratic stability number

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A stable set of a graph is a set of mutually non-adjacent vertices. A maximum stable set is a maximum size stable set and its size is called the stability number of the graph. Graphs whose stability number is equal to the optimal value of a convex quadratic problem are called graphs with convex quadratic stability number or graphs with convex-QP stability number. A major difficulty in the recognition of graphs with convex quadratic stability number is the existence of adverse subgraphs (an adverse subgraph is a subgraph such that the smallest eigenvalue of its adjacency matrix doesn't change when any vertex is deleted nor when the neighbourhood of any vertex is deleted). It is still a challenge to find out adverse graphs without convex quadratic stability number. In this work, we present the main results about graphs with convex quadratic stability number including some conclusions about the existence of adverse subgraphs with convex-QP stability number in graphs of certain families.

01378

Continuous nonlinear optimization of crude oil operations in refinery scheduling

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Refinery scheduling is modeled as a continuous nonlinear programming problem, considering crude oil operations from tankers to crude distillation units. Yes-No decisions are modeled as complementarity constraints, without binary variables. The refinery infrastructure is modeled as a graph, with equipment as nodes and connections as arcs. Each connection can have a transfer operation flow which is mapped as a continuous variable. Recent examples from the literature, based on actual refineries, are solved.