

Title: Selective opposition based constrained barnacle mating optimization: Theory and applications

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Abstract: Mathematical models of Barnacle Mating Optimization (BMO) are based on observations of real-world barnacle mating behaviors such as sperm casting and self-fertilization. Nevertheless, BMO considers penis length to produce new [offspring](#) through pseudo-copulated mating behavior, with no constraints like strong wave motion, food availability, or wind direction considered. Exploration and exploitation are two crucial optimization stages as we implement the constrained BMO. They are informed by models of navigational sperm casting properties, food availability, food attractiveness, wind direction, and intertidal zone wave movement experienced by barnacles during mating. We will later integrate opposition-based learning (OBL) with constrained BMO (C-BMO) to improve its exploratory behavior while retaining a quick convergence rate. Rather than opposing all barnacle dimensions, we just opposed those that went over the border. In addition to increasing efficiency by cutting down on wasted time spent exploring, this also increases the likelihood of stumbling onto optimal solutions. After that, it is put through its paces in a real-world case study, where it proves to be superior to the most cutting-edge algorithms available.

Keywords: Barnacle mating optimizerConstrained optimizationOpposition-based learningSelective oppositionMachine learningTime-series prediction

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