【文献調査】
A Reference Vector Guided Evolutionary Algorithm for Many-Objective Optimization

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1 タイトル

多目的最適化のための参照ベクトル誘導型進化的アルゴリズム

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3 出典

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4 アブストラクト

進化的多目的最適化では，収束性と多様性との間の良好なバランスを維持することは，進化的アルゴリズム (EA) の性能にとって特に重要である．さらに，目的数の増加につれて限られた母集団数を使用してパレート最適解の代表的なサブセットを獲得する可能性は低いため，ユーザーの嗜好を組込むことがますます重要になっている．本稿では，多目的最適化のための参照ベクトル誘導型 EA を提案する．参照ベクトルは，従来の多目的最適化問題を多数の単目的サブ問題に分解するために用いられるだけではなく，全パレートフロント (PF) の優先されるサブセットを対象とするユーザの嗜好を解明するためにも使用される．提案アルゴリズムでは，高次元の目的関数空間における解の収束性と多様性のバランスを取るために，角度のペナルティ距離と呼ばれるスカラー化手法が適用される．目的関数のスケールに応じて参照ベクトルの分布を動的に調整する適応戦略が提案される．様々なベンチマークテスト問題に関する我々の実験結果は，多目的最適化のための 5 つの最先端の EA と比較して，提案アルゴリズムが高い性能があることを示している．加えて，我々は参照ベクトルが嗜好のアーティキュレーションにおいて効果的でコスト効率が高いことを示し，それは多目的最適化において特に望ましい．さらに，参照ベクトル再生成戦略が不規則な PF を扱うために提案されている．最後に，提案アルゴリズムは制約付き多目的最適化問題を解くために拡張される．

5 キーワード

Angle-penalized distance (APD), convergence, diversity, evolutionary multiobjective optimization, many-objective optimization, preference articulation, reference vector.

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