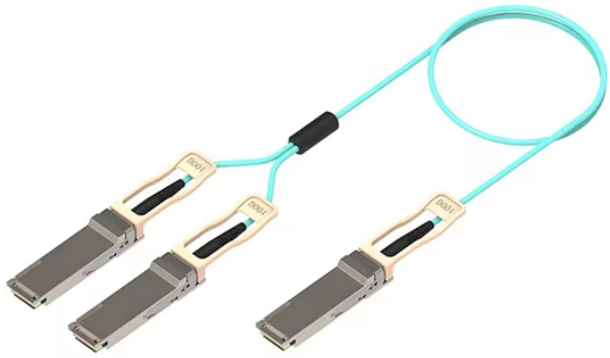
Cable-stayed bridge framework



Overview

This study proposes an integrated framework combining Gaussian process regression (GPR) with an enhanced whale optimization algorithm improved by the Salp Swarm Algorithm (EWOSSA). GPR is first used to model the nonlinear relationship between cable forces and structural responses. The synchronous construction of the pylon and cables of a cable-stayed bridge without backstays has the characteristics of a short construction period and reduced support costs. However, it also increases the difficulty of construction control, making the reasonable completion state of the bridge. To address this challenge, this paper proposes a dynamic trust-threshold-based active learning strategy (DGPR) within a surrogate-assisted decoupled optimization framework. The decoupled framework transforms the original problem into sub-problems with reduced cross-variable nonlinearity, while the. What are the main geometric features of cable-stayed bridges and which design requirements determine their form?

Earth anchorages of suspension cables are massive, while the horizontal component of stay-cable forces is resisted by the deck.

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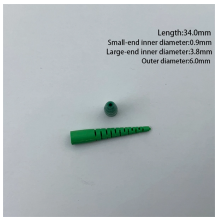
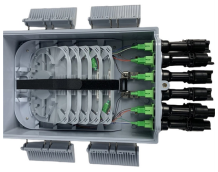
Due to the relative flexibility of the girder-tower system during erection, it is easier to adjust the profile by adjusting the cable lengths compared to conventional cantilever-constructed bridges.

Obtaining an optimum design for a cable-stayed bridge is challenging, due to the large number of design variables and design constraints that are typically nonlinear and usually conflict with...

This paper proposes HiDeNN-Opt, a cable force optimization framework for cable-stayed bridges with HiDeNN-FEM as the core, enabling efficient computation of the relationship between cable forces ...



This study introduces a novel framework for cable force optimization in cable-stayed bridges by integrating a MT-GNN surrogate model with the NSGA-II algorithm.



This study proposes a deep learning-based framework to evaluate the time-dependent reliability of cable-stayed bridges with corroded PSC box girders.

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These features make the proposed method a practical and useful tool for bridge engineers, especially at the preliminary design stages of cable-stayed bridges.

To enhance the reliability of cable force optimization in large-span cable-stayed bridges, this study presents a force optimization model that considers reliability indicators specific to...

Therefore, this paper presents a novel assessment framework for construction state control to ensure reasonable internal forces in cable-stayed bridges without backstays.

This study proposes an integrated framework combining Gaussian process regression (GPR) with an enhanced whale optimization algorithm improved by the Salp Swarm Algorithm ...

This paper presents a machine learning framework for assessing the reliability of cable-stayed bridge systems. The support vector machine (SVM) method is adopted as a substitute for the ...

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