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[54] NEW TYPE OF VIBRATION MEASUREMENT PLATFORM AND MEASUREMENT APPARATUS BASED ON QUASI-ZERO RIGIDITY THEORY 基於准零剛度理論的新型振動測量平台及測試裝置

[57] New type of vibration measurement platform and measurement apparatus based on quasi-zero rigidity theory provides a new type of vibration measurement platform/apparatus based on a quasi-zero rigidity theory, which comprises a base, at least four longitudinal beams, at least one cross beam, and an upper regulating part, a loading sensor, an upper extension spring, a mass block, a lower extension spring, and a lower regulating part that are arranged in sequence; support combinations for supporting the mass block horizontally are respectively formed between each of the four longitudinal beams and each of four sides of the mass block, each of the support combinations comprises an inner connecting member, an outer connecting member, a linear bearing, two regulating bolts, a carbon fiber slider, and a compressed spring, which are all mounted in one of the four sides of the mass block; a pre-compression amount λ0 of the compressed spring complies with a formula in the following: , wherein, the parameter a represents an equivalent length of the inner connecting piece, the parameter b represents an equivalent length of the outer connecting piece, the parameter L0 represents an original length of the compressed spring, the parameter Kv represents the rigidity of the upper extension spring, and the parameter Kh represents the rigidity of the compressed spring. The present utility model has the advantages of accurate measurement, low cost and timely measuring, and solves the drawbacks existing in vibration measurements using traditional acceleration sensors, such as time delay, error accumulation, and higher requirements for installing environments.

基於準零剛度理論的新型振動測量平台及測試裝置提供了一種基於準零剛度理論的新型振動測量平台及測試裝置，其包括底座、縱梁、橫樑及依次設置的上部調節件、載荷傳感器、上部拉伸彈簧、質量塊、下部拉伸彈簧及下部調節件，四根縱梁與質量塊的四側面之間分別形成有水平支撐質量塊的支撐組合，其包括卡於側面上的內部連接件、外部連接件、線性軸承、兩個調節螺栓、碳纖維滑杆及壓縮彈簧，壓縮彈簧的預壓縮量 λ0 滿足： 其中，a 為內部連接件的等效長度，b 為外部連接件的等效長度，L0 為壓縮彈簧的原長，Kv 為所述上部拉伸彈簧的剛度，Kh 為壓縮彈簧的剛度 。本新型實用具有測量準確，成本低以及測量及時的優點，解決了傳統加速度傳感器測量振動面臨的時間延遲，積累誤差及安裝環境要求高等缺點 。