$$L(\theta_{i+1}) = L(\theta_i) + [\nabla L(\theta_i)]^{\mathrm{T}}(\theta_{i+1} - \theta_i) + O\|\theta_{i+1} - \theta_i\|, \theta = [\mathbf{W}, \mathbf{B}]^{\mathrm{T}}$$

$$L(\theta_{i+1}) = L(\theta_i) - \alpha\|\nabla L(\theta_i)\|^2 + O\|\theta_{i+1} - \theta_i\|$$

Showcasing research from Professor Cheng Yan and Professor Guoqiang Li's laboratory, Department of Mechanical Engineering, Southern University and A&M College, Baton Rouge, US.

Overcoming the barrier: designing novel thermally robust shape memory vitrimers by establishing a new machine learning framework

This research innovatively applies machine learning (ML) to develop advanced Shape Memory Vitrimers (SMVs). It delves into the ML's mathematical framework, balancing high healing efficiency with elevated glass transition temperatures. Our breakthrough is four thermally robust SMVs, demonstrating exceptional recycling efficiency and shape memory capabilities. A highlight is an SMV with a 233.5 °C Tg, 84.1% recycling efficiency, and 33 MPa recovery stress, showcasing ML's transformative impact in smart polymer design.

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