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**Title: Experimental validation of an inextensible cloth model**

**Abstract:**

We introduce a new cloth model which models the dynamics of textiles as inextensible surfaces. This assumption challenges most models in literature where elasticity is allowed, sometimes by necessity (Textile Engineering) or in the pursuit of spectacularity (Computer Graphics). In order to integrate inextensibility and collision forces implicitly, we develop a novel active-set numerical algorithm which results in a non-decoupled resolution of contacts, friction and inextensibility in a single pass. Moreover, the inextensibility assumption is shown to be realistic by comparing simulations to experimental data in several scenarios, finding that the difference between the simulated and the real position of each point in garments is lower than 1cm on average.