

An Automatic Method to Reconstruct Human Movement by Considering a Reduced Number of Information: Application to the Automobile Ingress Movement

Debril J.-F.*, **Ait El Menceur M.O.***, **Pudlo P.***, **Gorce P.****, **Lepoutre F.X.***

*Univ Lille Nord de France, F-59000 Lille, France;
UVHV, LAMIH, F-59313 Valenciennes, France;
CNRS, FRE 3304, F-59313 Valenciennes, France;

(Tel:+33 (0)3 27 51 14 29; e-mail: philippe.pudlo@univ-valenciennes.fr).

** HANDIBIO EA 43-22, Université du Sud Toulon-Var, F-83957 La Garde, France (e-mail: philippe.gorce@univ-tln.fr)

Abstract: Measuring the automobile ingress movement is a stage towards the definition of a human physical model exploitable in new vehicles design. A part of information describing the movement is not measurable due to experimental constraints. A 2 stages method is proposed to reconstruct human movement. The first stage aims at building, automatically, a human model adapted to the anthropometry of the subject without manual reshaping on the subject. The second stage uses the human model and carries out a trajectory tracking based on a global optimization of the whole body under articular constraints. Two reconstructions of an automobile ingress movement, realized by considering the whole markers and a reduced number of markers, are compared. The articular coordinates resulting from these 2 reconstructions are correlated at more than 0.86, their average difference is lower than $\pm 4.7^\circ$ and their RMS is lower than 7° . The proposed method, thus, constitutes a good alternative to calculate the articular coordinates with a reduced number of information to study the automobile ingress movement.

Keywords: Human physical model, Motion capture, Data loss, Biomechanics, 3D motion analysis.
