1050-51-82   **Kirk Haller** and **Audrey Lee-St.John*** (`astjohn@mtholyoke.edu`), Computer Science Department, Mount Holyoke College, South Hadley, MA 01075, and **Meera Sitharam**, **Ileana Streinu** and **Neil White**. *Body-and-cad geometric constraint systems.*

Motivated by constraint-based CAD software, such as SolidWorks, we develop the foundation for the rigidity theory of a new model: the *body-and-cad structure*, composed of rigid bodies in 3D constrained by pairwise **c**oincidence, **a**ngle and **d**istance constraints. We identify 21 relevant geometric constraints and develop the corresponding infinitesimal rigidity theory for these structures. As a consequence, we identify a necessary, but not sufficient, combinatorial counting condition called *nested sparsity*. Note that the classical body-and-bar rigidity model can be viewed as a body-and-cad structure that uses only one constraint from this new class. (Received February 26, 2009)