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Laboratory model of the airborne jet-ski train riding on a soft porous track¹ PARISA MIRBOD, YIANNIS ANDREOPOULOS, SHELDON WEINBAUM, The City College of the City University of New York, New York, NY 10031, USA — A small laboratory scale prototype of the airborne jet train and its track has been designed and constructed to measure the pressure signals as the planform passes over a particular location. We considered a lift weight W of 1 kg fully supported when airborne by a planform that is 65 cm long and 10 cm wide symmetrically positioned beneath the prototype. Our prototype model used the same porous media, described in Mirbod et al. (2009) *J. Fluid Mech.* 619:127 for the full scale AJT, where the Darcy permeability K_p , is $3.4 \times 10^{-9} \text{ m}^2$. We have performed a parametric study to estimate the primary lift-off velocity U as a function of compression ratio, k for this value of K_p and W . We considered the simpler case where both the variation of K_p with compression and the small lift force due to the fiber phase are neglected in predicting the pressure distribution on the planform. One then integrated this pressure distribution over the surface of the planform and sets F in the expression for the dimensionless force $F = F K_p(H)/\mu L^2 U w$ equal to the weight W of the prototype model. This solution, which provided an expression for U as a function of k , is used to predict primary lift off velocity for a laboratory model and to obtain an initial estimate for the pressure distribution beneath the planform.

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Parisa Mirbod
City College of CUNY

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