

Abstract Submitted
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Reconfiguration of tree architecture under the effect of wind, competition for light, and annual growth CHRISTOPHE ELOY, IRPHE, Centrale Marseille — In general, trees have self-similar architectures with longer and thicker branches near the roots. Yet, branch segments grown each year always have approximately the same length. This hierarchy of branch lengths and the whole self-similar characteristics results in fact from a continuous process of growth of new branches and shedding of old ones. To assess how such a process affects tree architecture, a functional-structural mechanically-based model of virtual trees is developed. In this model, trees grow into fractal structures to promote efficient photosynthesis in a competing environment. In addition, branch diameters increase in response to wind-induced loads. The results of this model suggest that most self-similar characteristics of trees can be explained by considering that tree are growing structure able to resist mechanical loads due to wind efficiently.

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