



## **PROGRAMMA ATTIVITA' DIDATTICA A.A. 2018/2019**

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### **SEMINARIO**

**11 Giugno 2019, ore 15.00 - 17.00**

Biblioteca DISG – Sala Geotecnica

*Facoltà di Ingegneria Civile e Industriale - Università di Roma La Sapienza*

Via Eudossiana 18, Roma

**il Prof. Jean-Jacques Marigo**

Ecole Polytechnique – Laboratoire de Mécanique des Solides, Paris

terrà un Seminario dal titolo:

### **CONVERSION OF RAYLEIGH SURFACE WAVES BY TREES**

#### **ABSTRACT**

We inspect the propagation of Rayleigh surface waves through a forest of slender trees clamped in a soil substrate. Assuming that both the trees and the soil behave elastically, we consider the case when the surface wave frequencies are of the same order as the first eigenfrequencies of the trees, these latter ones corresponding to bending eigenmodes. Accordingly, denoting by  $\epsilon$  the small parameter corresponding to the ratio between the diameter and the height of the trees, the ratio between the height of the trees and the wavelength is also of order  $\epsilon$ . In other words, the trees can be considered as small surface defects. That presence of a small parameter allows us to develop an asymptotic analysis to find the influence of the trees on the propagation of Rayleigh waves at this range of frequencies. We show that the trees induce effective boundary conditions on the surface of the soil which are of Robin's type, the stiffness coefficients depending on the frequency of excitation. Those coefficients are obtained in a closed form and in particular we can show that the stiffness giving the shear stress in terms of the tangential displacement is infinite when the frequency of excitation corresponds to an eigenfrequency of the trees. Equipped with these effective boundary conditions, we are able to find how the surface waves are modified by the presence of the trees and in particular how they can be converted in bulk waves.

Tutti gli interessati sono invitati a partecipare.

Stefano Vidoli

Franco Bontempi

Roma, 7 Maggio 2019

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