



UMR Acoustique Environnementale
(Université Gustave Eiffel – Cerema)
INTERNSHIP PROPOSAL 2021

Internship topic

Impulse response of a loaded rolling tyre

Education level

Master (M2) Master (M1) Ingénieur Licence Bac + 2

Required skills

Master of Science in Mechanics, specialised in acoustics and vibration. Skills in computational mechanics and programming are essential. Writing skills in French and/or English are expected.

Description

The forced vibration of a tyre under excitation of road roughness plays an important role in the generation of tyre/road noise. The non-linearity of the contact problem requires to solve the tyre/pavement interaction problem in the time domain. During this step, the impulse response of the tyre (the so-called Green's function) must be coupled to the contact conditions in order to determine the variation of contact stresses during rolling.

The objective of the internship is to develop a method for calculating the impulse response of a deformed rolling tyre. The approach of Lopez (2011) will be used. It is based on the calculation in the time domain of the Green's function of the rolling tyre in the fixed reference frame attached to the vehicle (Eulerian description) from the eigenfrequencies and eigenmodes of the tyre under static loading calculated by the finite element approach. The method will first be formulated in a general framework, then validated using a simplified model (ring, membrane) before moving on to the case of a real tire.

References:

Lopez Arteaga, Ines. « Green's functions for a loaded rolling tyre ». *International Journal of Solids and Structures* 48, n° 25–26 (15 décembre 2011): 3462-70. <https://doi.org/10.1016/j.ijsolstr.2011.09.006>.

Internship location

- Uni Eiffel, Campus Lyon** (25, avenue François Mitterrand, Case24, Cité des mobilités, F-69675 Bron Cedex)
 Uni Eiffel, Campus Nantes (route de Bouaye, CS4, F-44344 Bouguenais Cedex)
 Cerema – Strasbourg (11, rue Jean Mentelin, Strasbourg-Koenigshoffen, F-67035 Strasbourg)

Internship duration (dates and duration can be adapted)

Starting date: 01/03/2021
Ending date: 30/08/2021
Duration: 6 months
www.umrae.fr

Contact

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Allowance

Compensation equivalent to 15% of the hourly ceiling of the Sécurité Sociale (loi n°2014-788 du 10 juillet 2014)
<http://www.service-public.fr/simulateur/calcul/gratification-stagiaire>

