The comparison of the case studies reveals that the trusses are subjected to a different deterioration process depending on the elements’ dimension and structural geometry, though the decay law applied is the same.
Rehabilitation strategies for deteriorating structures

1. Rossani barracks
2. Arsenal Bulding 65
3. Arsenal Bulding 15

It appears clear that Case 3 truss system is characterised by a lower reliability level than the other structures.

Network Infrastructure Resilience

Research developed with
- Jochim L’Hoir and Adrien Tellier, TFE – EPL
- Timothée Jacquin, TFE – EPL
Ordinary differential equations (ODE) modelling

Ordinary differential equations (ODE) modelling

Research developed with Beatriz Sato, TFE - EPL
Ordinary differential equations (ODE) modelling

Without slabs flexural stiffness

\[
\begin{align*}
\dot{v}_1^{IV} \cdot E \cdot I_p &= q(x) + \frac{E \cdot A}{L \cdot h} \cdot (v_2 - v_1) \\
\dot{v}_2^{IV} \cdot E \cdot I_c &= \frac{E \cdot A}{L \cdot h} \cdot (v_3 - 2 \cdot v_2 + v_1) \\
\dot{v}_3^{IV} \cdot E \cdot I_p &= -\frac{E \cdot A}{L \cdot h} \cdot (v_3 - v_2)
\end{align*}
\]

L. Sgambi, B. Sato. High-rise building modelling: numerical and analytical approaches
International Conference on Structures and Architecture, 24 – 26 July 2019
Ordinary differential equations (ODE) modelling

With slabs flexural stiffness

\[
\begin{align*}
&k_p \cdot \frac{d v_1^4 (x)}{dx^4} - k_{f1} \cdot \frac{d^2 v_1 (x)}{dx^2} - k_{f2} \cdot \frac{d^2 v_2 (x)}{dx^2} - k_a \cdot \left[ v_2 (x) - v_1 (x) \right] = q (x) \\
&k_e \cdot \frac{d v_2^4 (x)}{dx^4} - k_{f2} \cdot \frac{d^2 v_1 (x)}{dx^2} - k_{f3} \cdot \frac{d^2 v_2 (x)}{dx^2} - k_{f2} \cdot \frac{d^2 v_3 (x)}{dx^2} - k_a \cdot \left[ v_1 (x) - 2 \cdot v_2 (x) + v_3 (x) \right] = 0 \\
&k_p \cdot \frac{d v_3^4 (x)}{dx^4} - k_{f2} \cdot \frac{d^2 v_2 (x)}{dx^2} - k_{f1} \cdot \frac{d^2 v_3 (x)}{dx^2} + k_a \cdot \left[ v_3 (x) - v_2 (x) \right] = 0
\end{align*}
\]

Future researches

Elie Pauporté -> Vulnerability of Raw Earth construction

Lylian Kubiak -> Applications of Artificial Intelligence in architectural design