

# Risposta strutturale di elementi strutturali laminati

Laminato composito CF/PEEK ad uso biomedicale

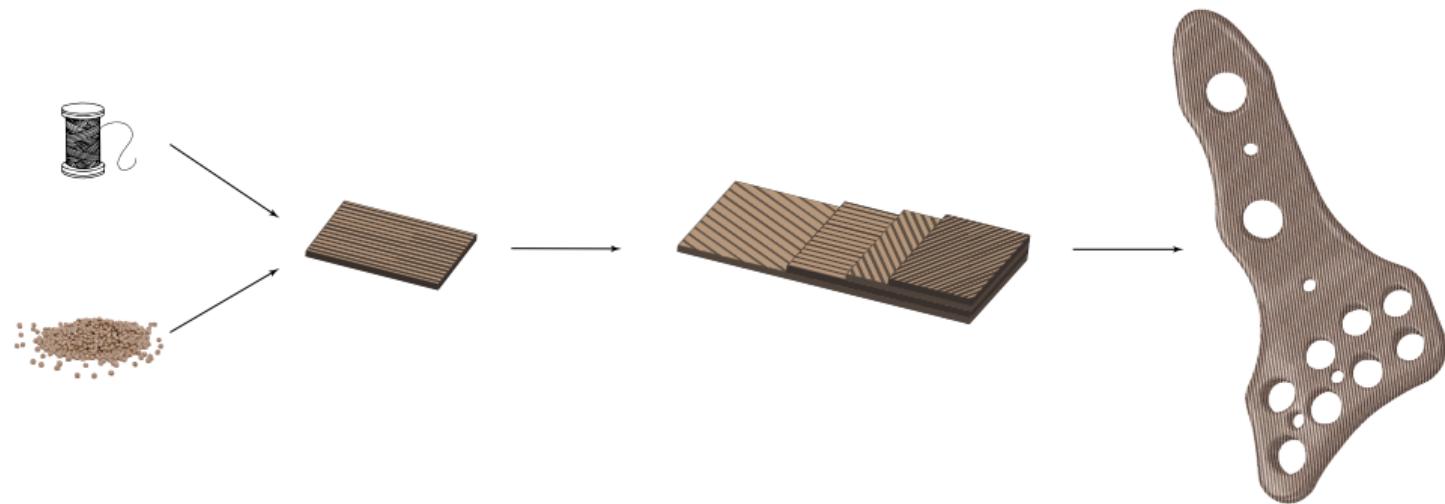
Alessandro Mastrofini

Meccanica Computazionale dei Tessuti e Biomateriali  
Università degli Studi di Roma Tor Vergata

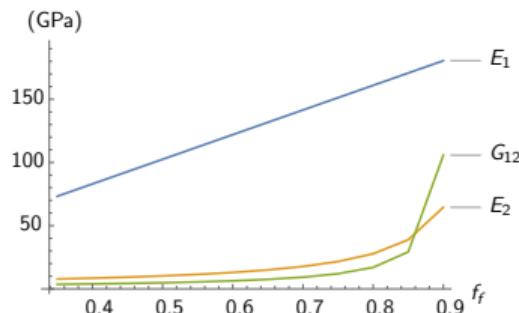
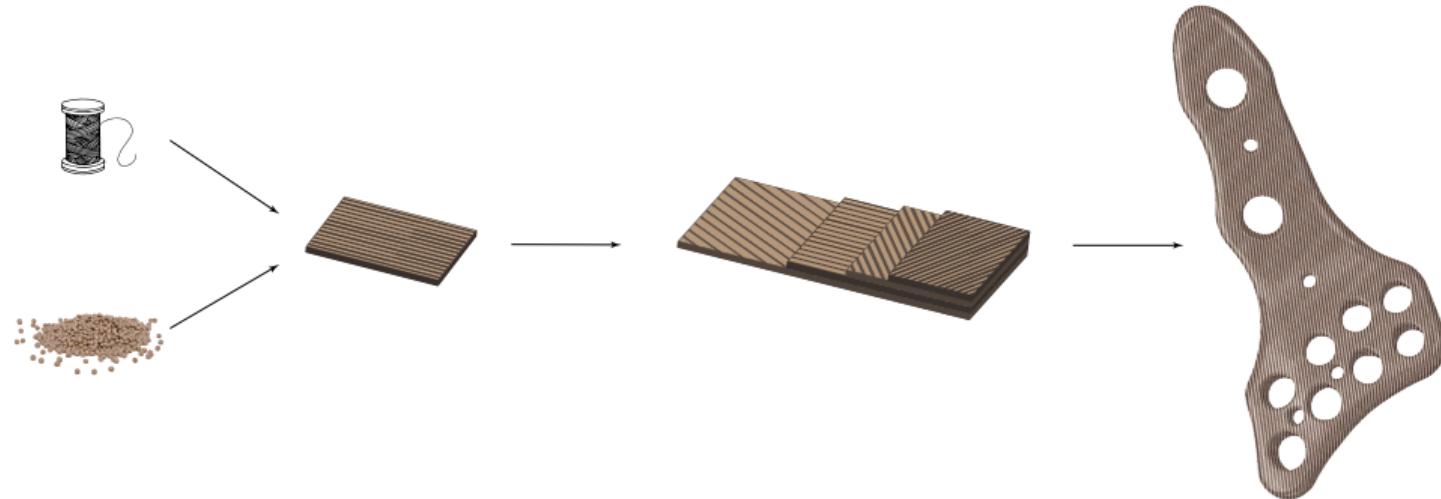
2022

## Composite laminate

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# Composite laminate



$$v_m + f_f = 1$$

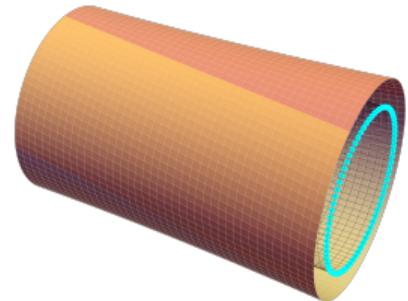
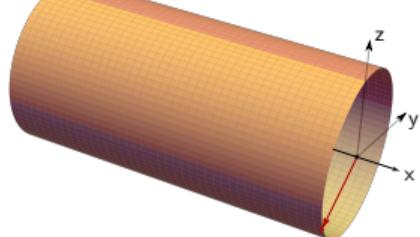
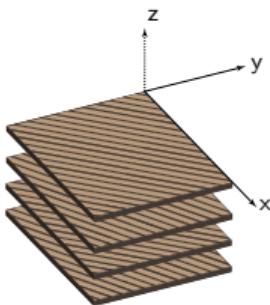
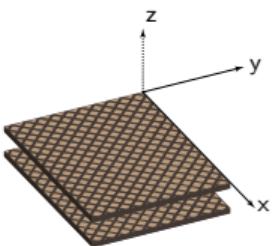
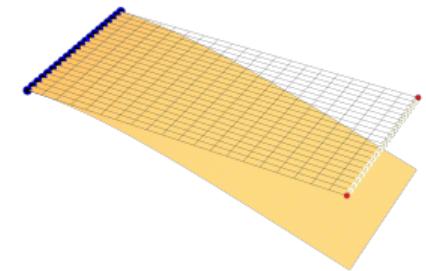
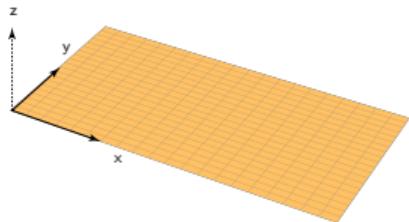
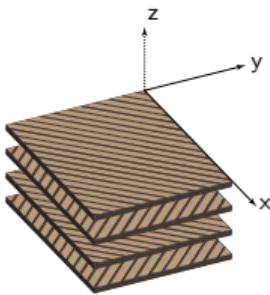
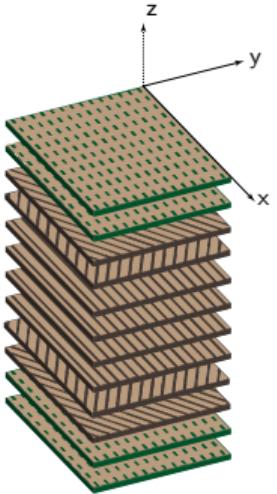
$$E_1 = f_f E_f + (1 - f_f) E_m$$

$$E_2 = \left( \frac{1 - f_f}{E_m} + \frac{f_f}{E_f} \right)^{-1}$$

$$G_{12} = \left( \frac{v_m}{G_m} + \frac{v_f}{G_f} \right)^{-1}$$

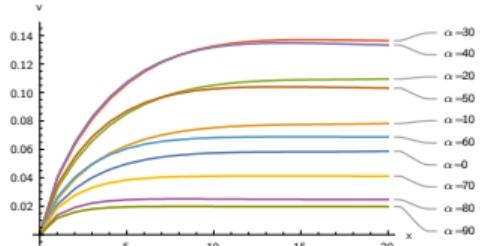
# Layout

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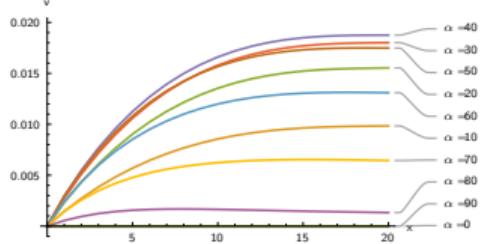


# Parametric analysis

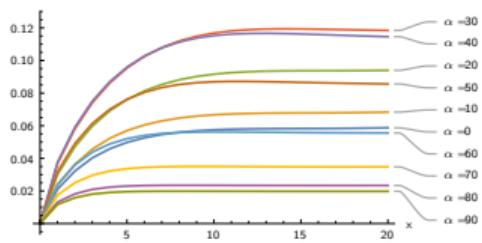
Both load



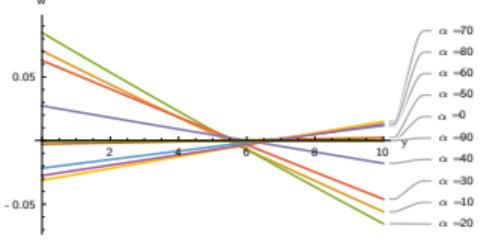
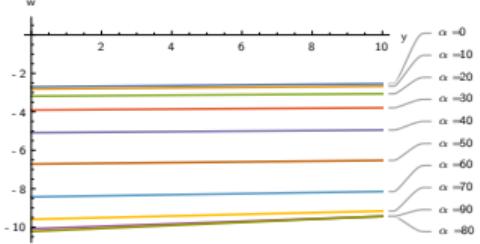
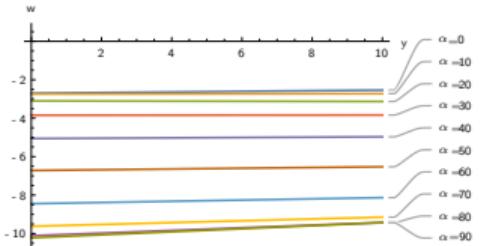
Transversal



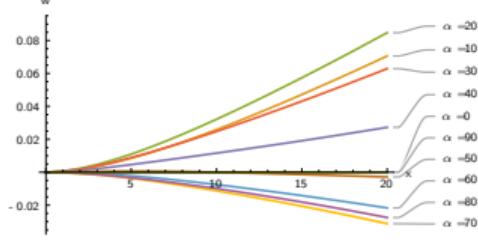
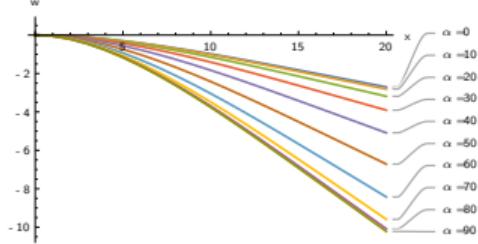
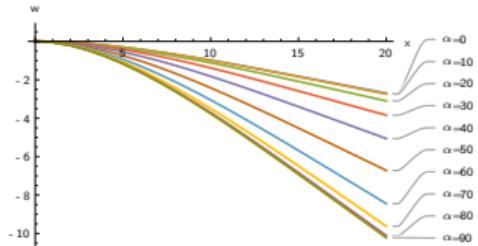
Axial



$v$  displacements on  $y = 0$



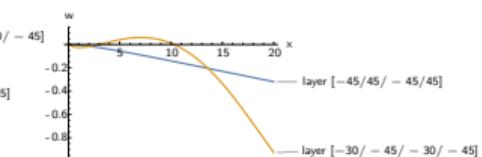
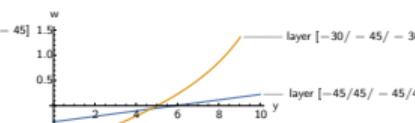
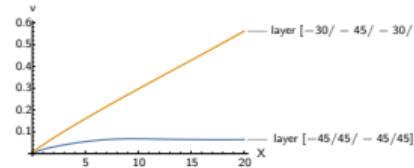
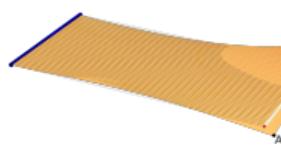
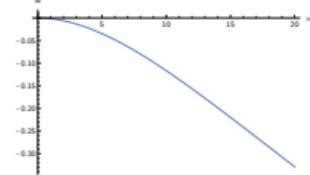
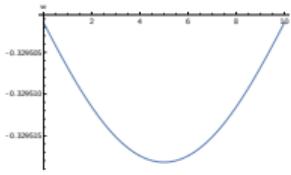
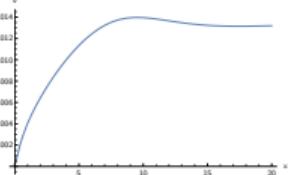
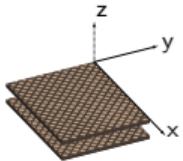
$w$  displacements on  $x = L$



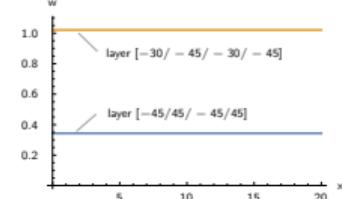
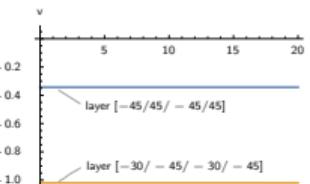
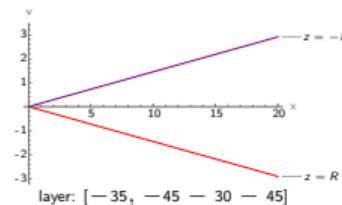
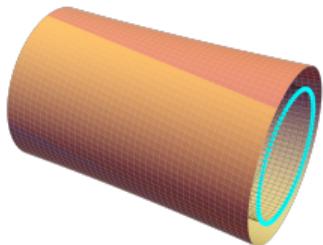
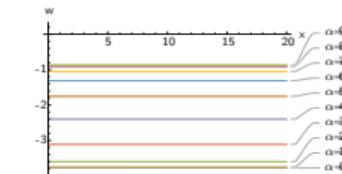
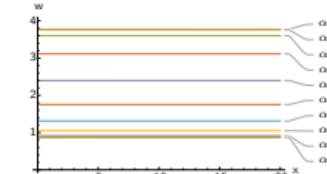
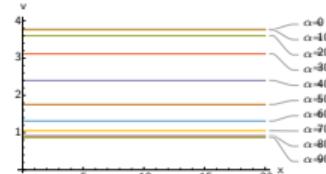
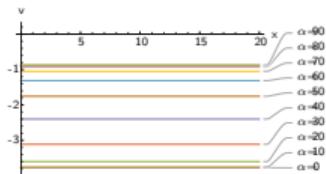
$w$  displacements on  $y = 0$

# Layout analysis

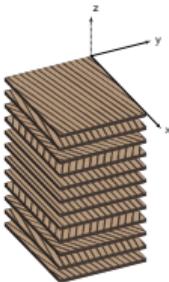
Fabric with both load



Cylinder with  $\alpha \in [0, 90]$



# Plate thickness



Axial +  
transversal  
 $(\lambda F_{\perp})$  load  
with  $\lambda \in$   
 $\{1; 2; 5; 10; 20; 30\}$

