

# Numerical simulation for the yield behaviour of stochastic fibre reinforced composites with overlap

Xiude Lin and Hanxing Zhu

*School of Engineering, Cardiff University, Queen's Buildings, The Parade, Cardiff, CF24 3AA*

**Abstract:** The transversely isotropic stochastic fibre reinforced composite with a novel geometrical structure is proposed in the present work and the 3D representative periodic volume element (RVE) has been generated for the study. Periodic boundary conditions are adopted in the finite element simulations [1, 2]. The number of cross-linkers and the degree of overlap are two key factors in determining the volume fraction of fibre networks which is the crucial parameter of fibre composites. In order to avoid the over constraint caused by embedded element technique (EET) while applying periodic boundary conditions (PBC) [1, 2] to the RVE, the automatic searching and coupling technique (ASC) is applied to couple the corresponding nodes between fibres and matrix. The results indicate that compared to the conventional stochastic fibre reinforced composites, fibres in the present geometry are bonded together to form a network among fibres [3, 4] and thus significantly enhance the stiffness [3] and strength of the composite.

## References

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