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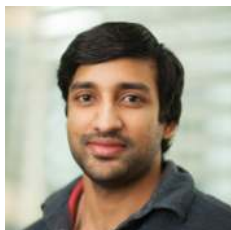
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Multifidelity Design Optimisation Models for Composite AWE Wings

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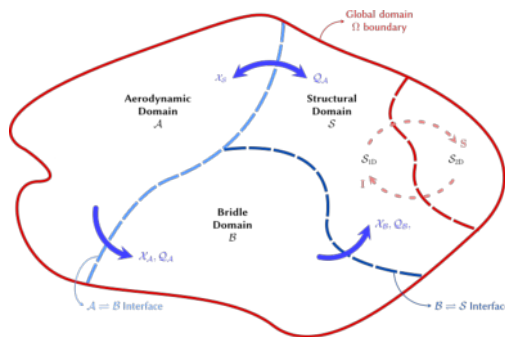
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Composite materials are the standard choice for fixed-wing AWE wings, given their high stiffness-to-weight ratios. These anisotropic materials typically undergo complex load-deflection couplings, further complicated by the wing geometry. These complicated deflections could give rise to undesirable aeroelastic phenomena and hence require consideration, already in the initial design stages. EnerKite utilises ultra-light, slender carbon composite wings to minimise airborne mass. A set of multifidelity models is presented that builds upon the toolchain consisting of a group of 2+1D solvers for the aerodynamic A, bridle B and structural S domains [1,2]. The aeroelastic response is determined by a steady-state

coupling of the solvers [3]. An approach is suggested that describes the structural domain S in varying levels of complexity, facilitating solving for the complex lamination layer plan only as the final step. This allows for the rapid screening of design candidates without having to prescribe detailed lamination layouts and other manufacturing constraints that are typically unknown at the initial design stage. This proposed method can thus probe the vast initial design space, considering configurations in the aerodynamic A, bridle B and structural S domains [4].

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Partitioned approach and information exchange for coupling of the different AWE domains.