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**ASEN 6037** TURBULENT FLOWS

LITERATURE REVIEW: *A Hybrid RANS-LES  
Approach with Delayed-DES and Wall-Modelled LES  
Capabilities*

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# 1 Introduction

This literature review will cover the content and background of “A Hybrid RANS-LES Approach with Delayed-DES and Wall-Modelled LES Capabilities”[1].

## 2 Work Summary

This work introduces a new hybrid RANS-LES turbulence model, which was later dubbed improved delayed detached eddy simulation (IDDES). This model builds on previous work on hybrid turbulence models by introducing a new function that allows the model to enter a wall-modeled LES mode.

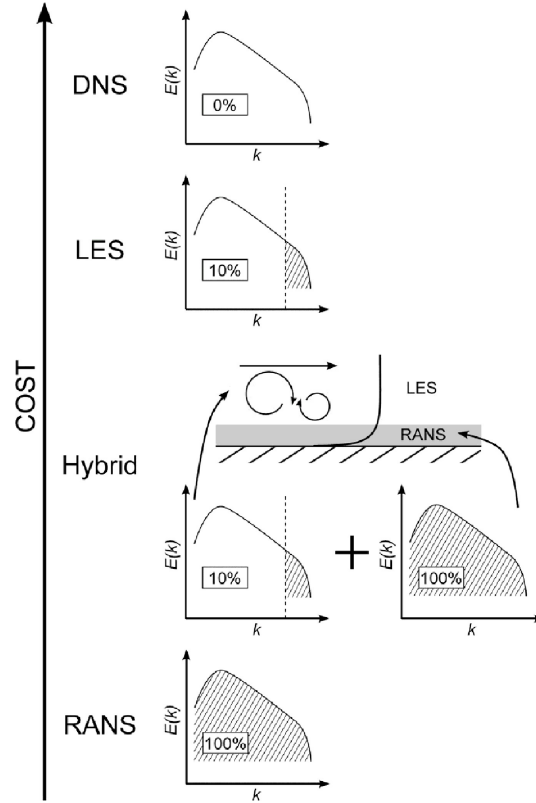


Figure 1: Hybrid Turbulence models. Reproduced from [2] under the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>).

## References

- [1] M. L. Shur, P. R. Spalart, M. K. Strelets, and A. K. Travin, “A hybrid RANS-LES approach with delayed-DES and wall-modelled LES capabilities”, *International Journal of Heat and Fluid Flow*, vol. 29, no. 6, pp. 1638–1649, 2008, ISSN: 0142727X. DOI: 10.1016/j.ijheatfluidflow.2008.07.001.
- [2] P. G. Tucker and J. C. Tyacke, “Eddy resolving simulations in aerospace - Invited paper (Numerical Fluid 2014)”, *Applied Mathematics and Computation*, vol. 272, pp. 582–592, 2015. DOI: 10.1016/j.amc.2015.02.018.