# Reply by Authors to G. D. Stubley and G. Riopelle

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STUBLEY and Riopelle[1] correctly point out that strong rotation can affect the turbulence dissipation rate, as suggested by the studies of Wigeland and Nagib,[2] and Bardina et al.[3] This effect could be important for flows in high speed turbomachinery, although the results of Launder et al.[4] indicate that it is relatively small in some parameter ranges. The direct effect of rotation on dissipation rate or equivalently, on the turbulence macroscale, did not escape our attention and is discussed in a companion paper (Kantha et al.[5]), where the correction term suggested by Bardina et al.[3] is generalized and incorporated into the length scale equation. A reference to this paper has been made in Galperin and Kantha.[6] However, this paper concentrates on an algebraic Reynolds stress model to look at rotational effects.

In Galperin and Kantha's approach, the turbulence length scale is normalized out and the analytical results, the focus of their paper, are independent of the length scale equation. It is clear that when this model is applied to high speed turbomachinery, one must exclude cases of extremely high rotational rates at which turbulence strongly deviates from the states of three-dimensionality and near-local isotropy. The same is true of other turbulence models that have been applied to turbomachinery flows (see the review by Lakshminarayana[7]). But as can be seen from Lakshminarayana's review, the basic agreement of the results of various turbulence models with experimental data indicates that the assumptions of second moment closure retain their validity in most turbomachinery applications.

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## References

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