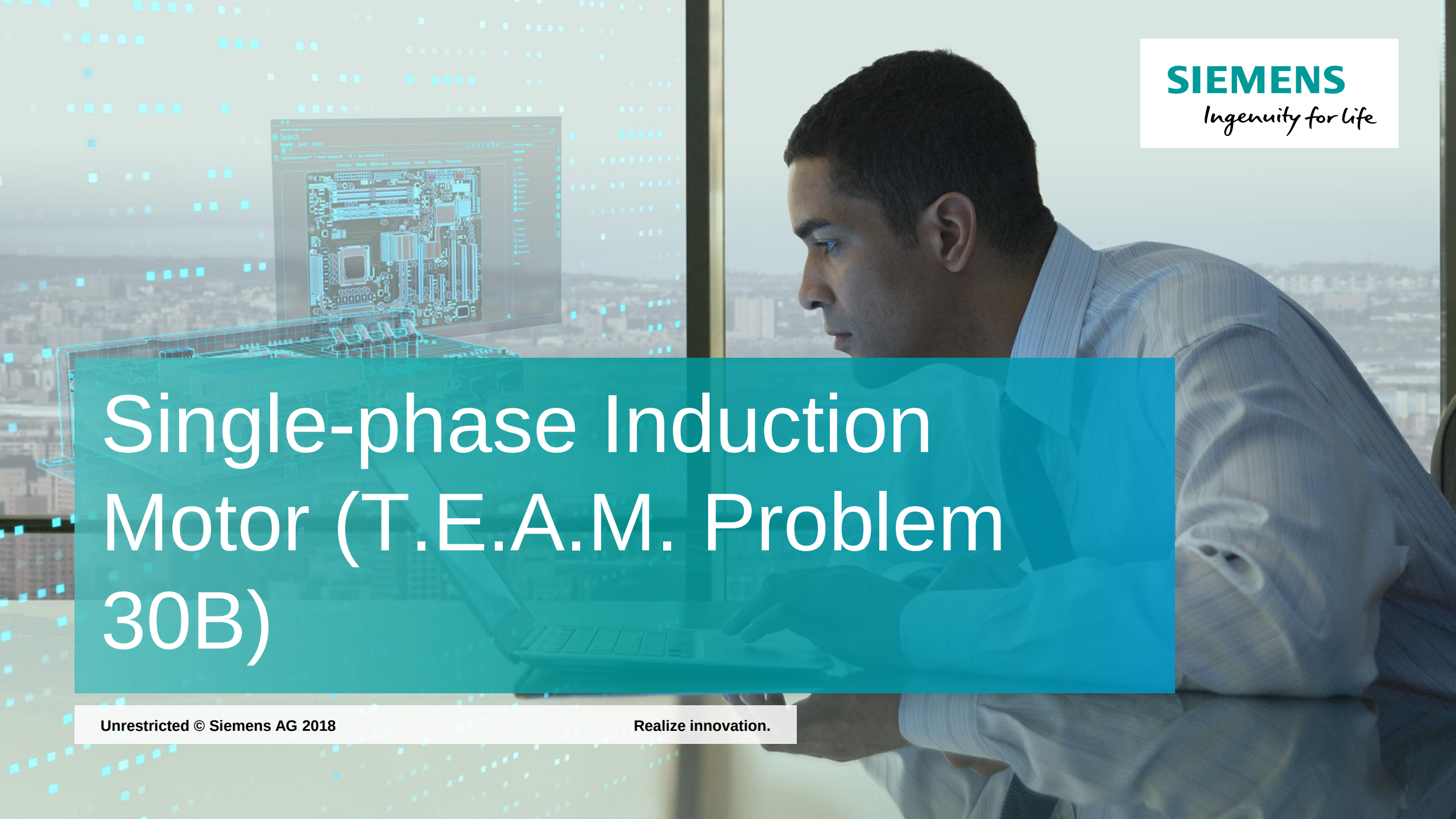

# Single-phase Induction Motor (T.E.A.M. Problem 30B)

# Single-phase Induction Motor (T.E.A.M. Problem 30B)

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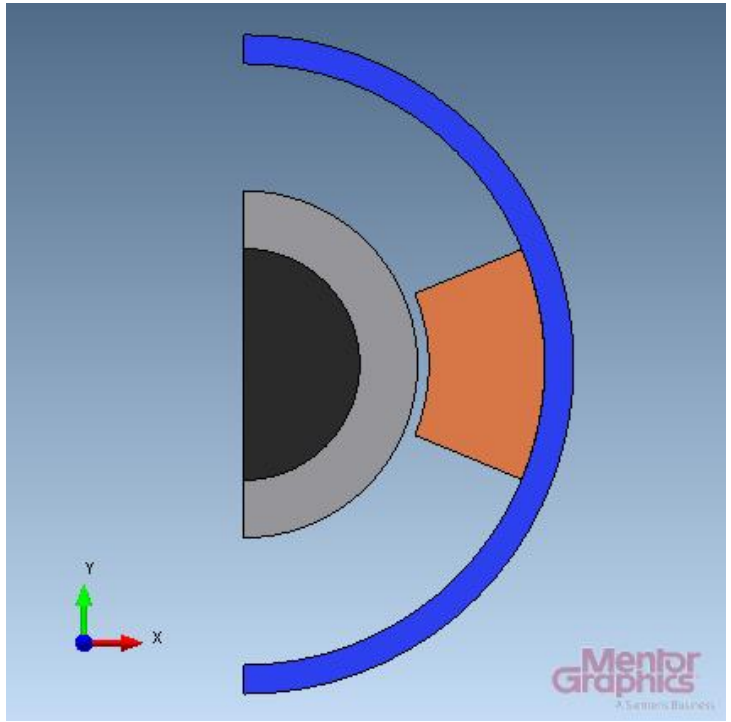
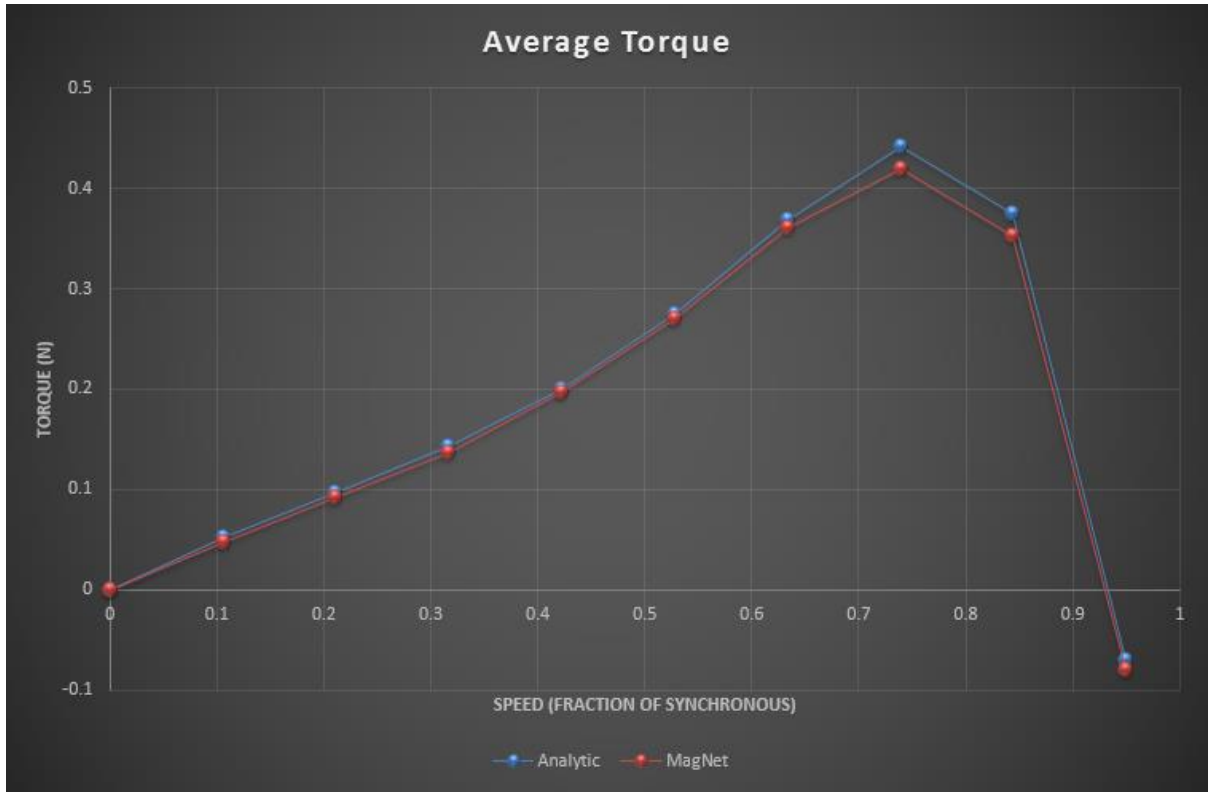
Presented is a half-model of a single-phase induction motor which has a periodic boundary condition on the plane of symmetry. It was simulated using the MagNet transient 2d with motion solver in a single transient run, as a velocity-driven problem. All of the torque results obtained from the model must be multiplied by 2 in order to compare with the analytic results.




The velocity was specified as a staircase function spending 100 ms at each speed, enough time for the transients to die out. A time step of 1 ms was used, but the last 16.666666 ms at each speed, i.e. the last period, was calculated in 0.1666666 ms steps to allow for more accurate integration. The average torque was calculated from the transient waveforms in the last 20 ms at each speed.

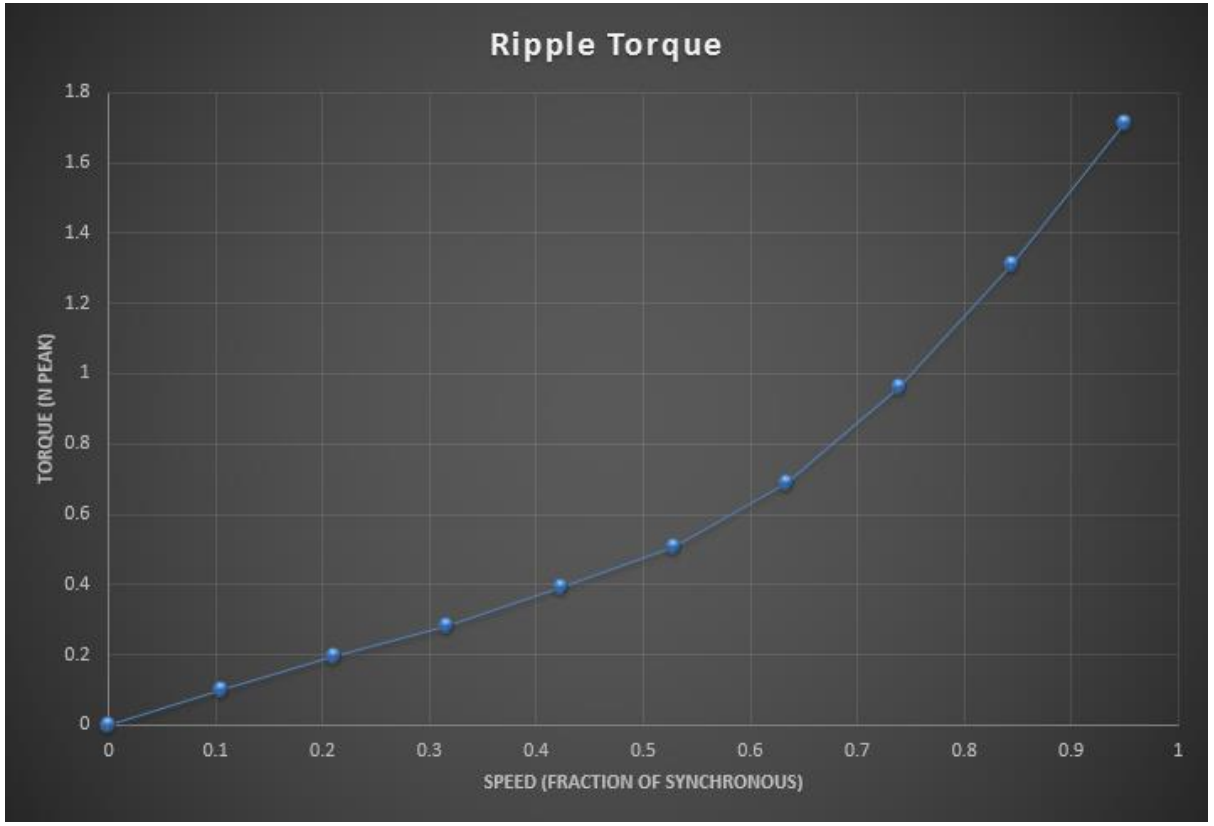
The following is based on the Testing Electromagnetic Analysis Methods (T.E.A.M.) problem #30B: Analytic Analysis of Single and Three Phase Induction Motors. The benchmark can be found on the International Compumag Society's website.

# COMPARING MAGNET'S RESULTS TO THE ANALYTICAL RESULTS




The average torque at different speeds from zero to synchronous speed (blue trace), compared to the analytic results (red trace).

# RIPPLE TORQUE




The ripple torque, which close to synchronous speed, is larger than the average torque. This implies that during part of the cycle the magnetic forces work against the rotor motion.