Performance Analysis of 3D Printed Electric Machines

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- 3D printing enables innovations in low-volume production.

- Advantages over traditional manufacturing methods:
  - Faster and cheaper prototyping.
  - Reduced lead times.
  - Shorter supply chains.

- Examples of manufacturers using metal 3D printing:
  - GE: fuel nozzles for the next generation jet engines.
  - UTRC: high power automobile traction electric machines.

- Concerns about 3D printing:
  - Reliability of 3D printed objects.
  - High cost, and speed for high-volume production.

- Crucial to understand how 3D printing process affects the performance of electric machines:
  - Our goal: evaluate the torque capability, core loss, residual stress, and deformation.
  - Our approach: employ numerical modeling methods such as finite element analysis to achieve the evaluation and to inspire optimal designs.