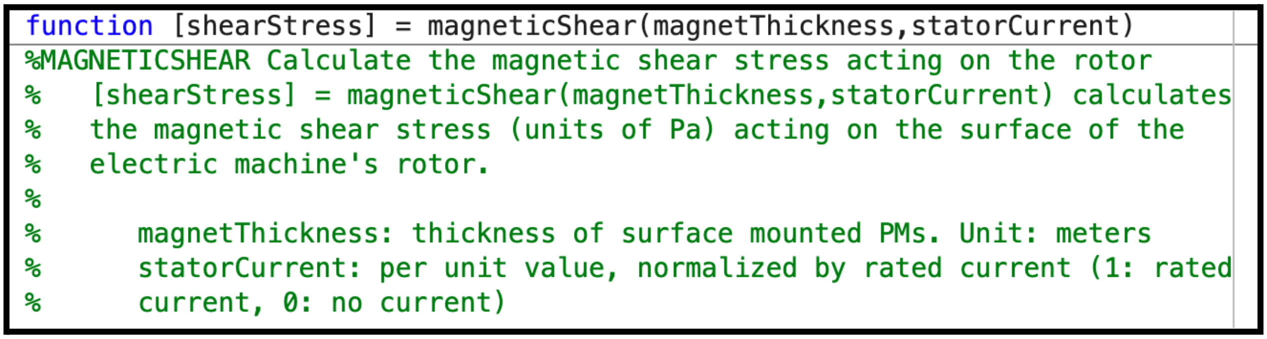
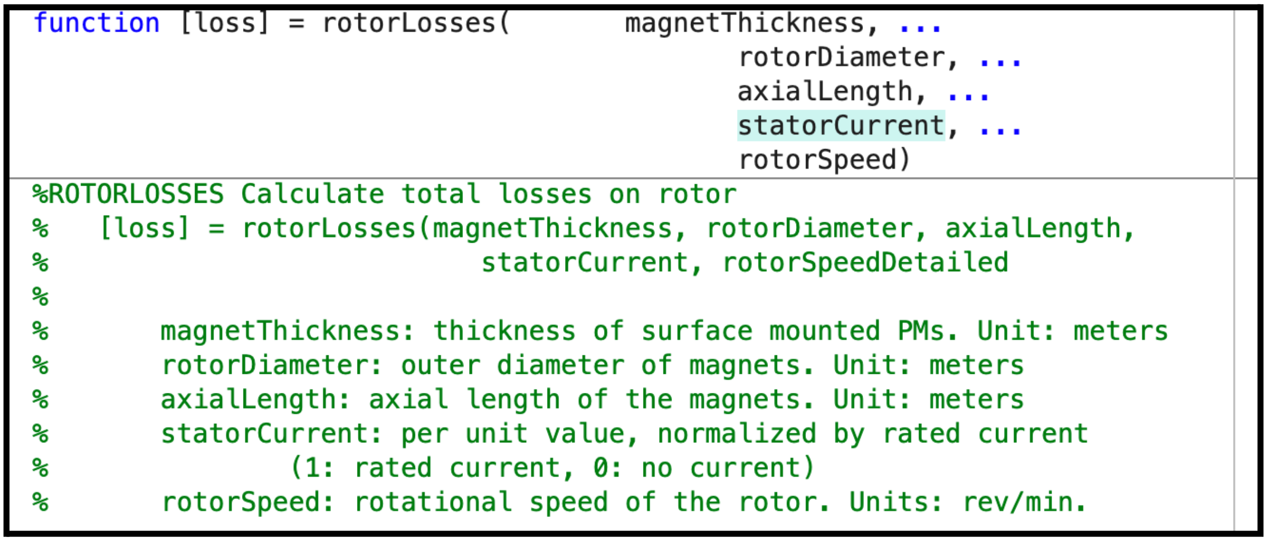
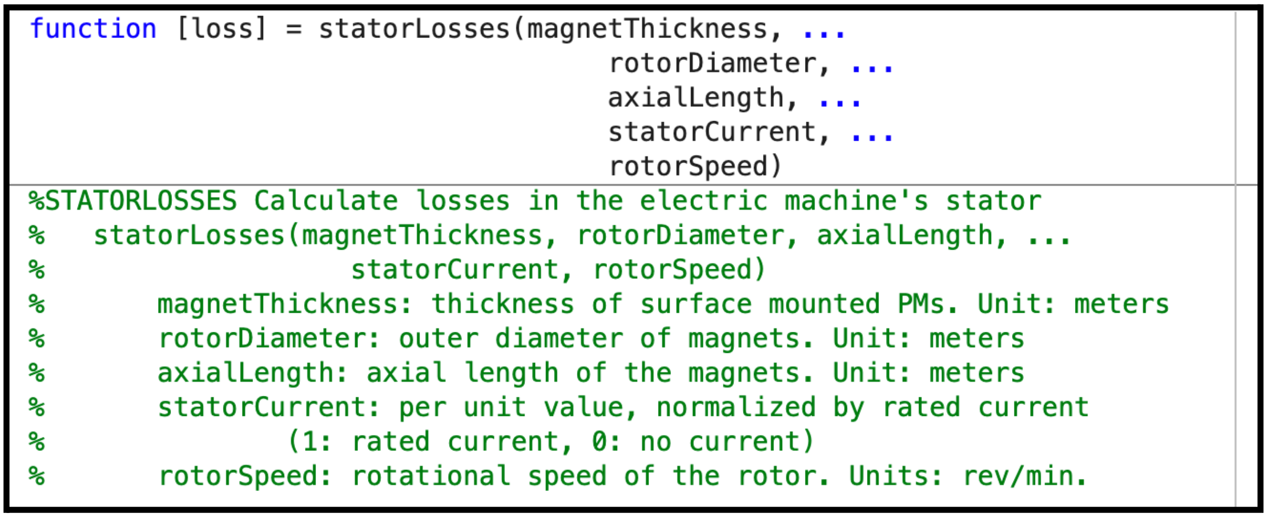
Appendix A: Function Specification for MATLAB Code Provided



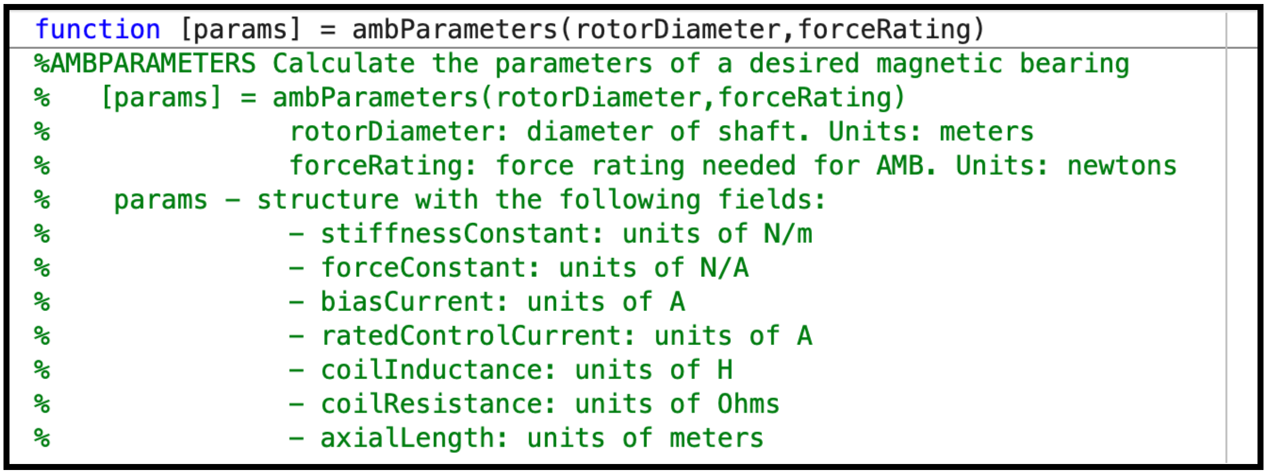
```matlab
function [shearStress] = magneticShear(magnetThickness,statorCurrent)
%MAGNETICSHEAR Calculate the magnetic shear stress acting on the rotor
%   [shearStress] = magneticShear(magnetThickness,statorCurrent) calculates
%   the magnetic shear stress (units of Pa) acting on the surface of the
%   electric machine's rotor.
%
%      magnetThickness: thickness of surface mounted PMs. Unit: meters
%      statorCurrent: per unit value, normalized by rated current (1: rated
%      current, 0: no current)
```



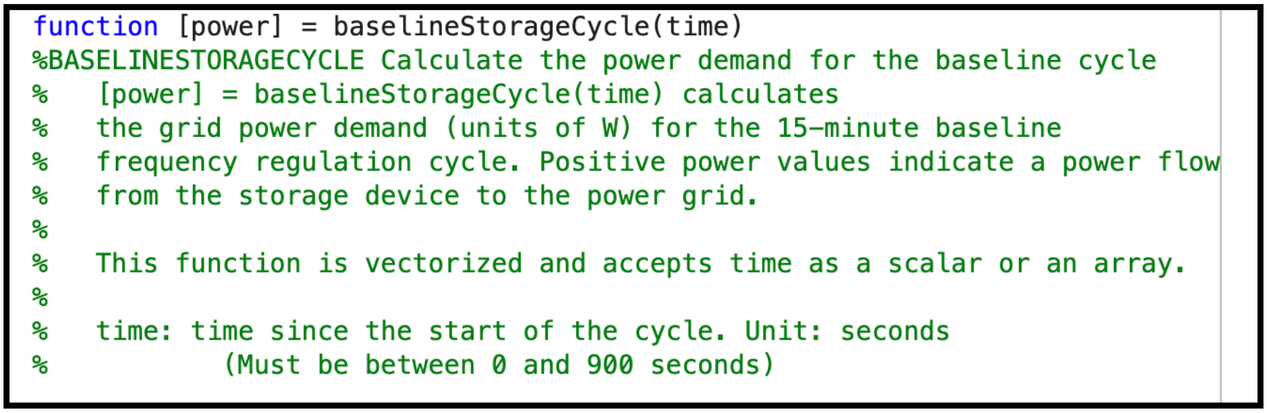
```matlab
function [loss] = rotorLosses(       magnetThickness, ...
                                            rotorDiameter, ...
                                            axialLength, ...
                                            statorCurrent, ...
                                            rotorSpeed)
%ROTORLOSSES Calculate total losses on rotor
%   [loss] = rotorLosses(magnetThickness, rotorDiameter, axialLength,
%                           statorCurrent, rotorSpeedDetailed
%
%       magnetThickness: thickness of surface mounted PMs. Unit: meters
%       rotorDiameter: outer diameter of magnets. Unit: meters
%       axialLength: axial length of the magnets. Unit: meters
%       statorCurrent: per unit value, normalized by rated current
%               (1: rated current, 0: no current)
%       rotorSpeed: rotational speed of the rotor. Units: rev/min.
```



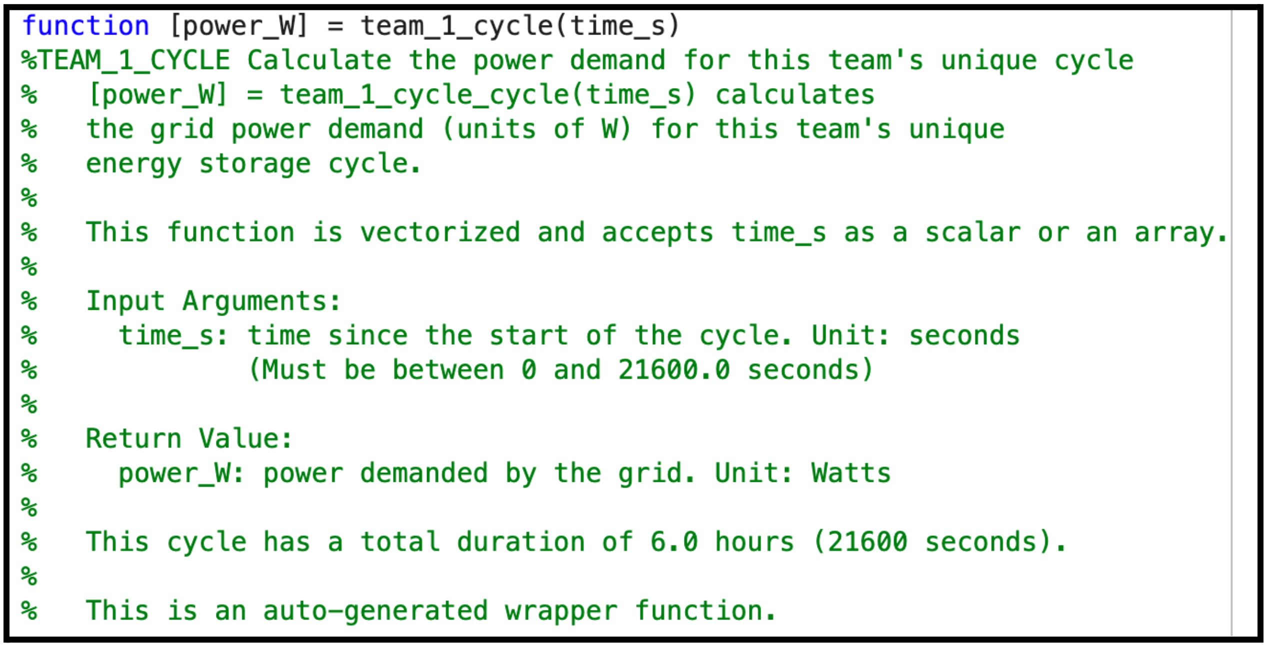
```matlab
function [loss] = statorLosses(magnetThickness, ...
                                    rotorDiameter, ...
                                    axialLength, ...
                                    statorCurrent, ...
                                    rotorSpeed)
%STATORLOSSES Calculate losses in the electric machine's stator
%   statorLosses(magnetThickness, rotorDiameter, axialLength, ...
%                   statorCurrent, rotorSpeed)
%       magnetThickness: thickness of surface mounted PMs. Unit: meters
%       rotorDiameter: outer diameter of magnets. Unit: meters
%       axialLength: axial length of the magnets. Unit: meters
%       statorCurrent: per unit value, normalized by rated current
%               (1: rated current, 0: no current)
%       rotorSpeed: rotational speed of the rotor. Units: rev/min.
```



```
function [params] = ambParameters(rotorDiameter,forceRating)
%AMBPARAMETERS Calculate the parameters of a desired magnetic bearing
%   [params] = ambParameters(rotorDiameter,forceRating)
%               rotorDiameter: diameter of shaft. Units: meters
%               forceRating: force rating needed for AMB. Units: newtons
%    params - structure with the following fields:
%               - stiffnessConstant: units of N/m
%               - forceConstant: units of N/A
%               - biasCurrent: units of A
%               - ratedControlCurrent: units of A
%               - coilInductance: units of H
%               - coilResistance: units of Ohms
%               - axialLength: units of meters
```



```
function [power] = baselineStorageCycle(time)
%BASELINESTORAGECYCLE Calculate the power demand for the baseline cycle
%   [power] = baselineStorageCycle(time) calculates
%   the grid power demand (units of W) for the 15-minute baseline
%   frequency regulation cycle. Positive power values indicate a power flow
%   from the storage device to the power grid.
%
%   This function is vectorized and accepts time as a scalar or an array.
%
%   time: time since the start of the cycle. Unit: seconds
%           (Must be between 0 and 900 seconds)
```



```
function [power_W] = team_1_cycle(time_s)
%TEAM_1_CYCLE Calculate the power demand for this team's unique cycle
%   [power_W] = team_1_cycle_cycle(time_s) calculates
%   the grid power demand (units of W) for this team's unique
%   energy storage cycle.
%
%   This function is vectorized and accepts time_s as a scalar or an array.
%
%   Input Arguments:
%     time_s: time since the start of the cycle. Unit: seconds
%             (Must be between 0 and 21600.0 seconds)
%
%   Return Value:
%     power_W: power demanded by the grid. Unit: Watts
%
%   This cycle has a total duration of 6.0 hours (21600 seconds).
%
%   This is an auto-generated wrapper function.
```

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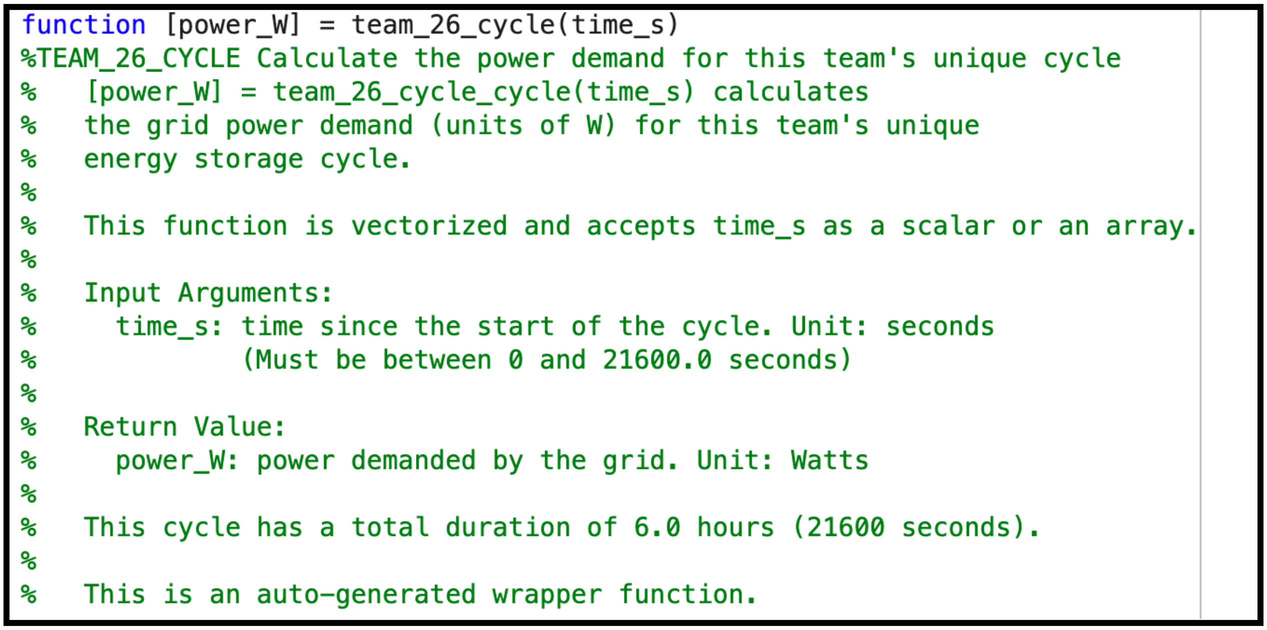

```
function [power_W] = team_26_cycle(time_s)
%TEAM_26_CYCLE Calculate the power demand for this team's unique cycle
%   [power_W] = team_26_cycle_cycle(time_s) calculates
%   the grid power demand (units of W) for this team's unique
%   energy storage cycle.
%
%   This function is vectorized and accepts time_s as a scalar or an array.
%
%   Input Arguments:
%     time_s: time since the start of the cycle. Unit: seconds
%             (Must be between 0 and 21600.0 seconds)
%
%   Return Value:
%     power_W: power demanded by the grid. Unit: Watts
%
%   This cycle has a total duration of 6.0 hours (21600 seconds).
%
%   This is an auto-generated wrapper function.
```