Retrieving a parameter value

- The `model` data structure has fields for temperature and for all other dynamic parameters of the ESC model

  `model.temps`

  `model.parameter`

  where `parameter` is the field name for any of the dynamic-relationship parameters in Lesson 2.3.3
- Retrieving a specific parameter value is essentially a table lookup of parameter value versus temperature for a specific temperature
- The Octave/MATLAB code that you will see in this lesson is written for efficiency, so it requires some discussion to understand how it works

Preliminaries

- The following code isolates all the data for the parameter of interest and ensures temperature is in range

```
% function theParam = getParamESC(paramName,temperature,model)
%
% Returns the values of the specified ESC cell-model parameter 'paramName' for
% the temperatures in 'temperature' for the cell model data stored in 'model'.
% 'paramName' may be one of: 'QParam', 'RCParam', 'RParam', 'R0Param', 'MParam',
% 'M0Param', 'GParam', 'EtaParam' (not case sensitive).
function theParam = getParamESC(paramName,temp,model)
  temp = min(temp,max(model.temps)); % prohibit NaNs!
  temp = max(temp,min(model.temps));

  mdlFields = fieldnames(model);
  theField = find(strcmpi(paramName,mdlFields));
  if isempty(theField), error('Bad argument to "paramName"'); end
  fieldData = model.(mdlFields{theField});
  theParam = repmat(fieldData,size(temp)); % default, if only one data temp
```


Function lookup

- The following code performs the table lookup
- Special cases avoid `interp1` whenever possible

```
  if length(fieldData)>1,
    if length(temp)>1,
      theParam = interp1(model.temps,fieldData,temp,'spline');
    else
      ind = find(model.temps == temp);
      if ~isempty(ind), % avoid call to (slow) interp1 whenever possible
        theParam = fieldData(ind);
      else
        theParam = interp1(model.temps,fieldData,temp,'spline');
      end
    end
  end
```

Summary

- Remember, it is not considered good coding practice for user code to access the `model` data structure directly
- So, the ESC toolbox includes functions to perform this data access for you
- You have now seen how to retrieve an ESC model parameter value for temperature(s) of interest
- The procedure is essentially a table lookup into the vectors of data stored by `model`