TROUBLESHOOTING

A. Software Not Running

- To avoid malfunctioning of the software run as a result of incompatibility with the CST model, the CST Microwave Studio version used in FDE 1.0 must be the same as that used to design the simulation model. For example, using a model built in CST Microwave Studio 2014, but adopting CST Microwave Studio 2016 with FDE 1.0 may lead to wrong results or unexpected errors.

- ***Variable Name Conflict***
  For optimization problems involving CST models, it is strongly recommended for the user to double-check the parameter list of the CST model to ensure consistency with the variable names being specified in the FDE 1.0 to avoid a conflict in the variable names. (Please see section 4.1 in the users' guide)

- ***CST Timeout***
  The CST Timeout is recommended to be 2-3 times the approximate duration (in seconds) for the simulation runtime of your filter model in the CST Microwave Studio. Please note that if short timeout durations are set, the CST Microwave Studio simulation pool will timeout too early hampering the optimization process. (Please see section 4.1 in the users' guide)

- ***CST Output***
  Before executing FDE 1.0, the user needs to check and confirm the data format for CST outputs or results in the CST Microwave Studio. The storage mode for CST outputs or results must be set to ASCII and SQL. (Please see section 4.1 in the users' guide)

- ***Save Button***
  It is strongly recommended for the user to always use the save button at every stage of the setting process to keep the software updated with the latest defined inputs or progress.

B. Unsatisfactory Result

Please note that in the user's guide, the special difficulty of filter design landscape has been explained. If the first optimization run gives an unsatisfactory result, the following tips may be useful.

- ***Very High Specifications***
  Specifying very high design requirements in the first run is not a good way for any optimization tool. This is because the fitted design may not exist and the nearest design to the specifications becomes sensitive to the weights. As such, it is strongly recommended to specify moderate

design requirements first to determine the feasibility of probable high specifications, and gradually update the design specifications.

- ***Using Large Ranges***
  The optimal/feasible region of a filter design landscape is often very narrow. Using large ranges for the design variables can make this optimal region relatively even narrower. This largely increases the difficulties. FDE 1.0 uses two sets of ranges to address this problem. It is strongly recommended to use a small inner range and then use an outer range to limit the design variables. For details, please see Section 3.4 of the user's guide.

- ***Using Large Scales***
  Again, due to the narrow optimal region, experiments show that using large values of the 'scale' parameter can cause the optimization to fail. It is strongly recommended to adopt moderate scales using the recommended maximum scales as a guidance. For details, please see Section 3.4 of the user's guide.

To sum up, before an optimization, please first make sure that the specifications and ranges of the design variables are as appropriate as possible. If an optimization fails, please try to use a smaller scale parameter. For most very difficult problems, experiments show that successful results can be obtained within 3 tunings of the scale parameter.

C. CST Closes the Programme and Sometimes Even Closes MATLAB

- Sometimes, the bugs of CST may close the MATLAB command window. In this case, please restart MATLAB, load FDE 1.0 and then use "Open" in the main menu. Select "project.mat" and all the previous data will be loaded. The user can start again from the broken point. (Please see Section 4.1 and Section 4.2 in the users' guide).