UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Escola Superior d'Enginyeries Industrial, Aeroespacial i Audiovisual de Terrassa

ESEIAAT - UPC

Study for the computational resolution of conservation equations of mass, momentum and energy. Possible application to different aeronautical and industrial engineering problems: Case 1B

Attachment A - Results

Author: Laura Pla Olea
Director: Carlos David Perez Segarra
Co-Director: Asensio Oliva Llena
Degree: Grau en Enginyeria en Tecnologies Aeroespacials
Delivery date: 10-06-2017

Contents

List of Tables

List of Figures

1 | Smith-Hutton problem

In the following sections there are represented the results of the Smith-Hutton problem for all the resolution schemes that have been coded.

1.1 $\rho/\Gamma = 10$

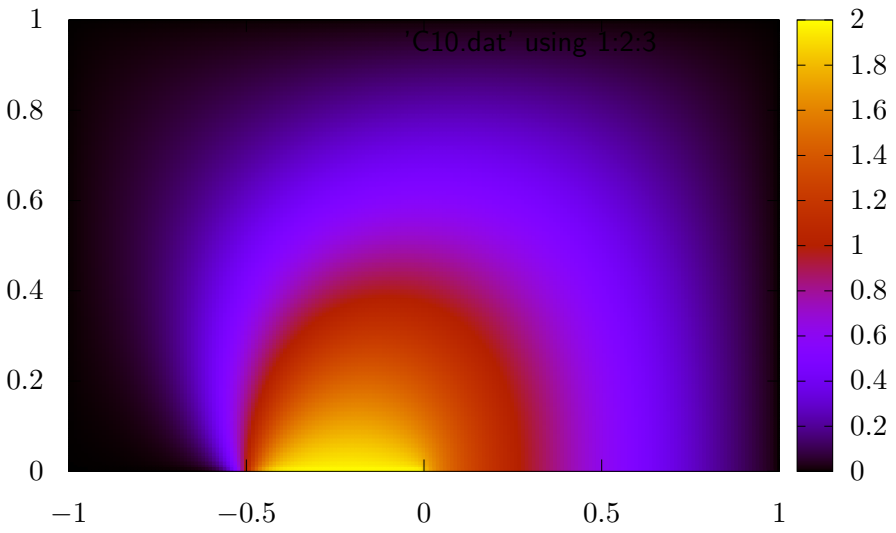


Figure 1.1: Representation of the whole domain for $\rho/\Gamma = 10$ (CDS)

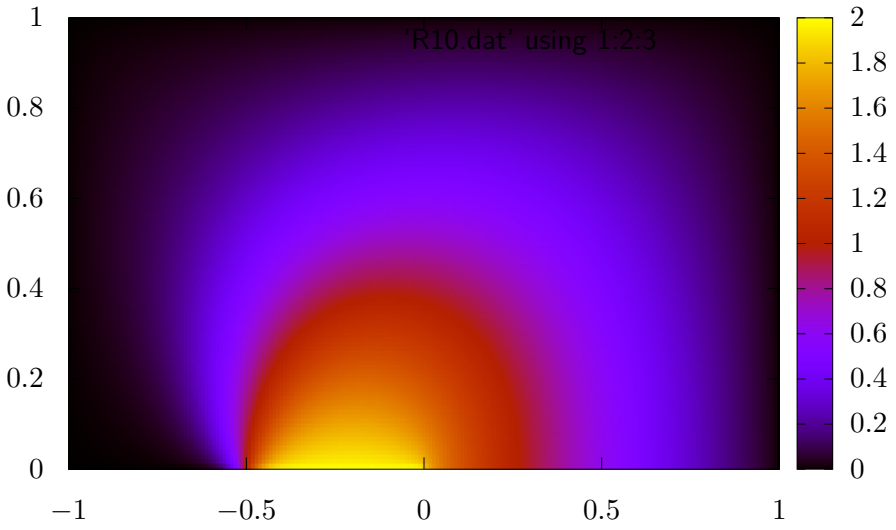


Figure 1.2: Representation of the whole domain for $\rho/\Gamma = 10$ (UDS)

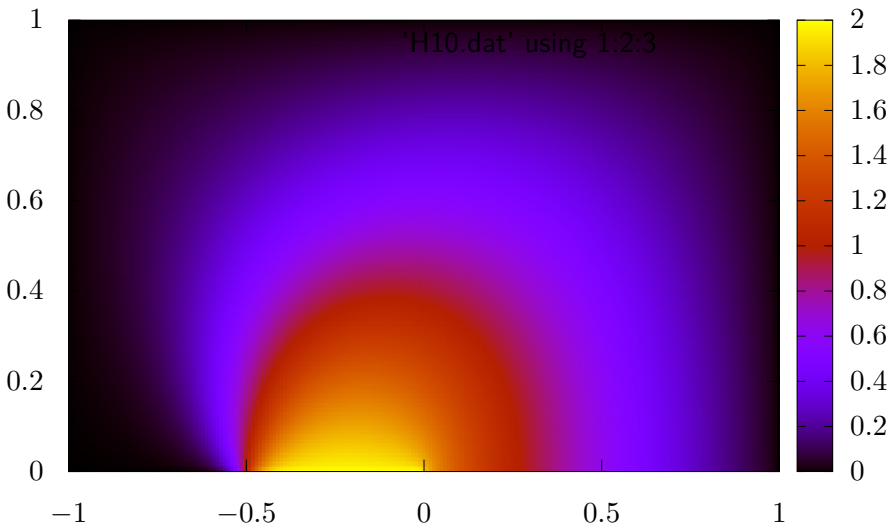


Figure 1.3: Representation of the whole domain for $\rho/\Gamma = 10$ (HDS)

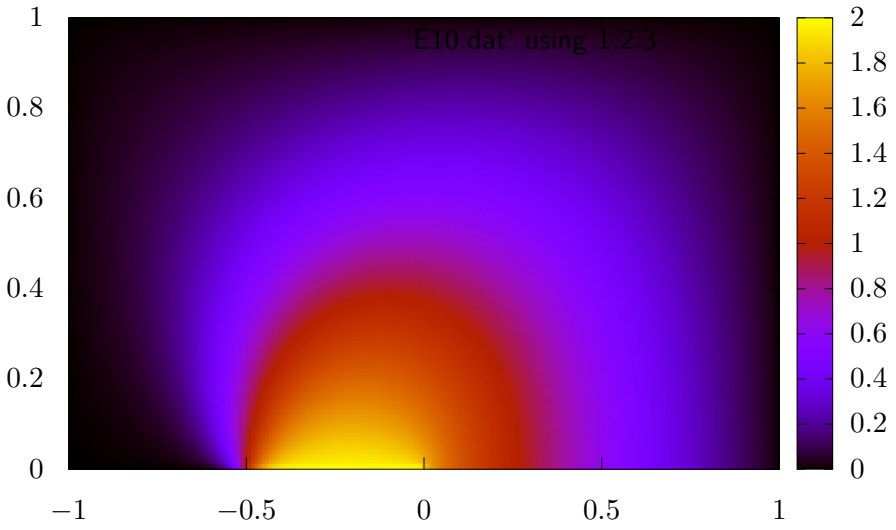


Figure 1.4: Representation of the whole domain for $\rho/\Gamma = 10$ (EDS)

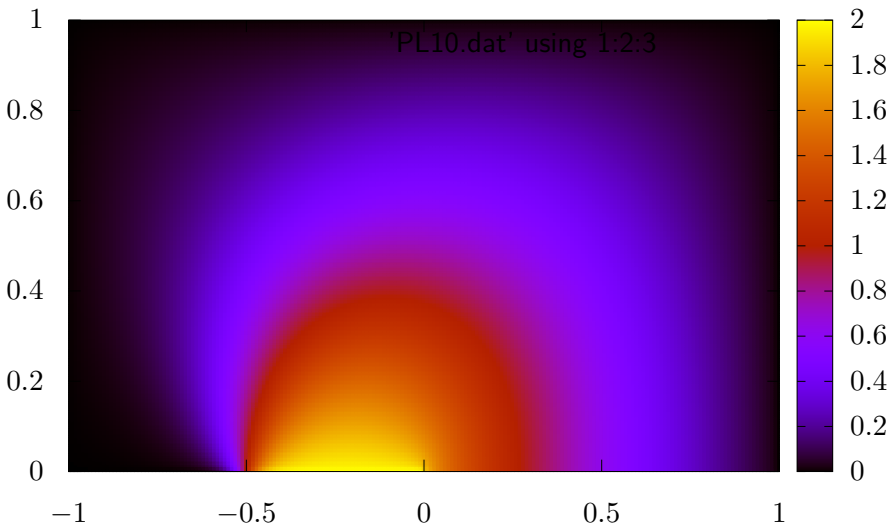


Figure 1.5: Representation of the whole domain for $\rho/\Gamma = 10$ (PLDS)

1.2 $\rho/\Gamma = 10^3$

In this section there is not a solution for the central differencing scheme because it diverges.

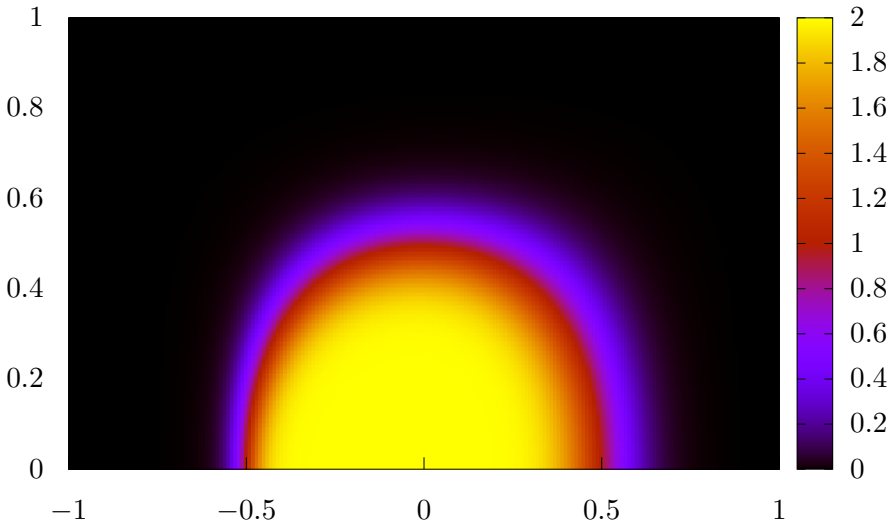


Figure 1.6: Representation of the whole domain for $\rho/\Gamma = 10^3$ (UDS)

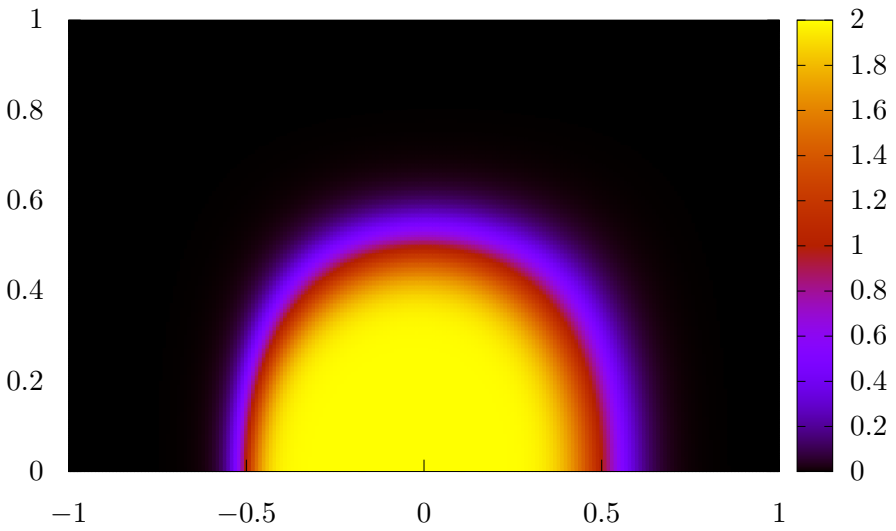


Figure 1.7: Representation of the whole domain for $\rho/\Gamma = 10^3$ (HDS)

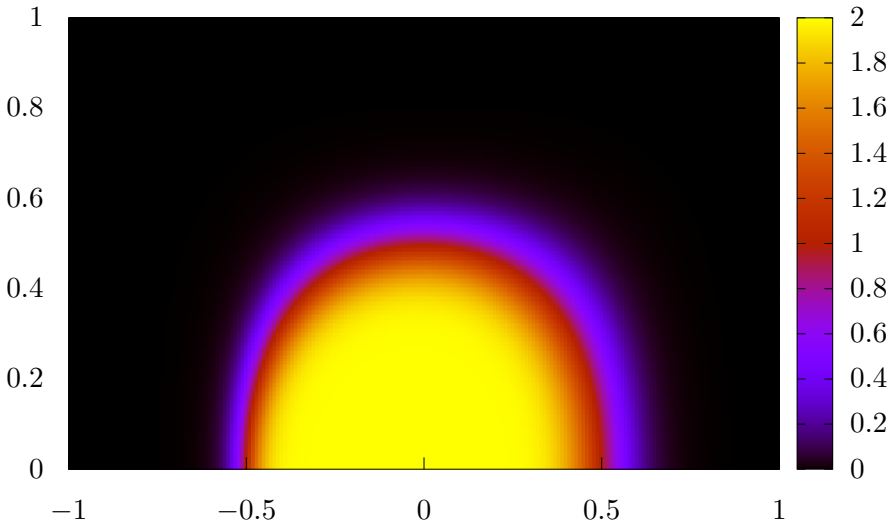


Figure 1.8: Representation of the whole domain for $\rho/\Gamma = 10^3$ (EDS)

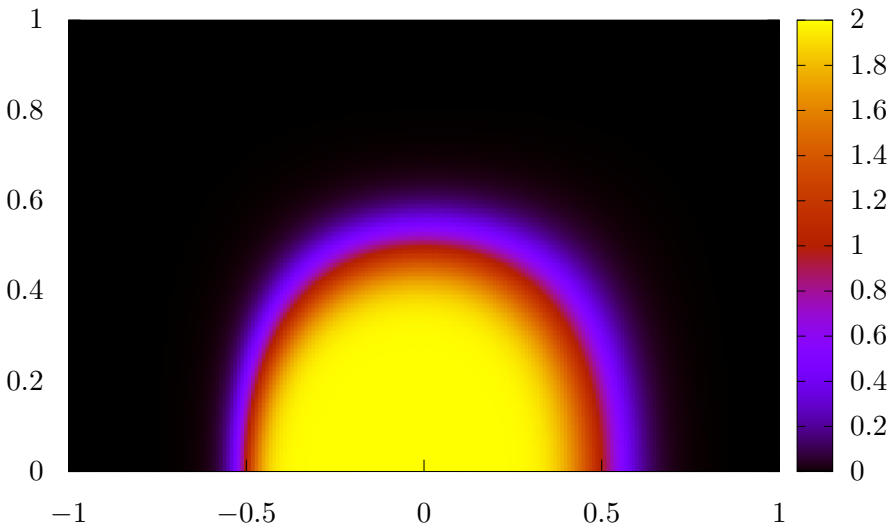


Figure 1.9: Representation of the whole domain for $\rho/\Gamma = 10^3$ (PLDS)

1.3 $\rho/\Gamma = 10^6$

Like in the previous section, in this case there is no results for the central differencing scheme because of its divergence.

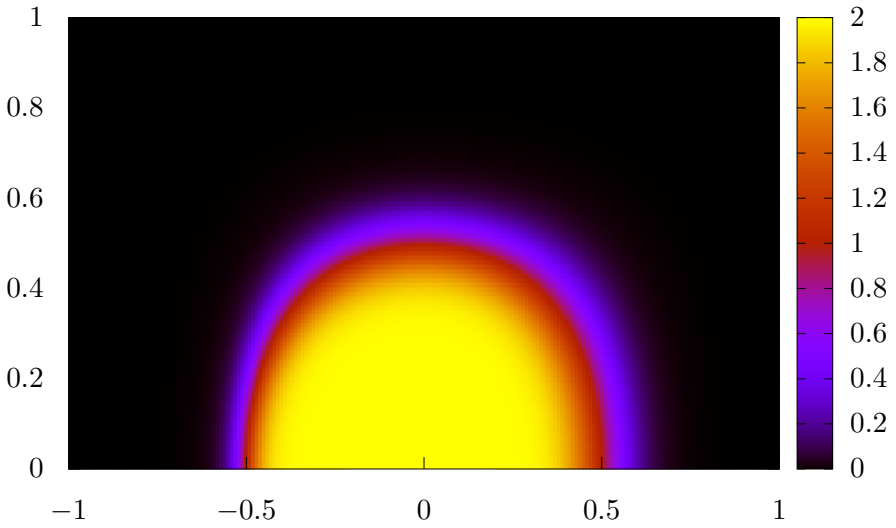


Figure 1.10: Representation of the whole domain for $\rho/\Gamma = 10^6$ (UDS)

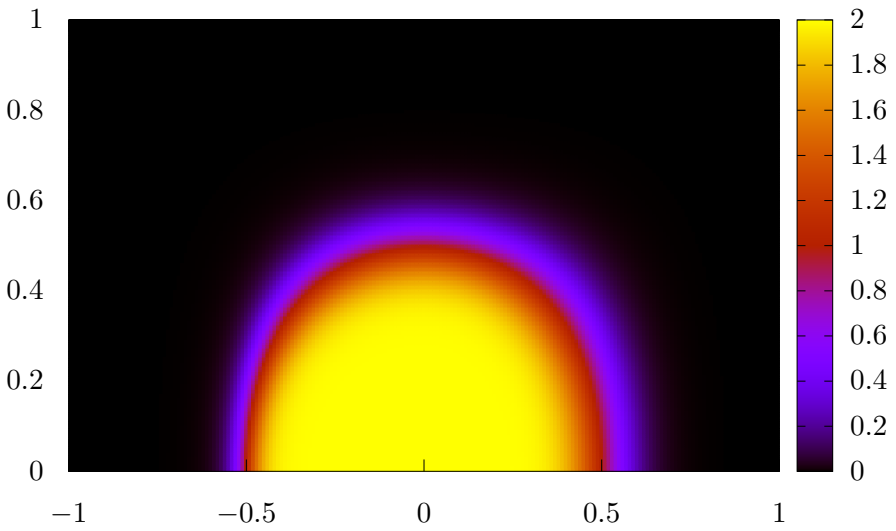


Figure 1.11: Representation of the whole domain for $\rho/\Gamma = 10^6$ (HDS)

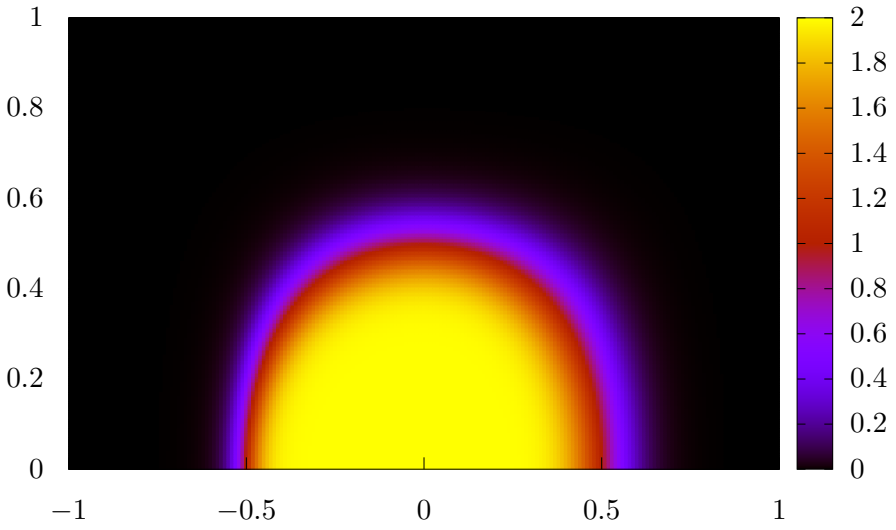


Figure 1.12: Representation of the whole domain for $\rho/\Gamma = 10^6$ (EDS)

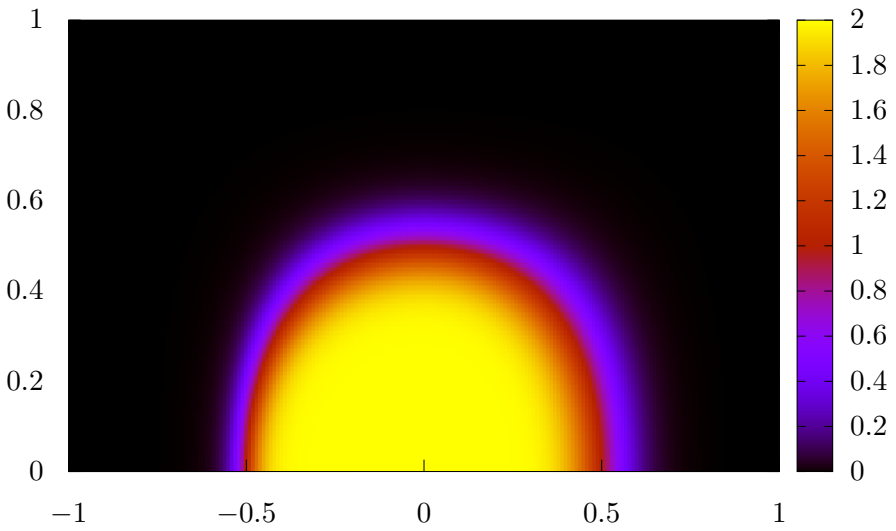
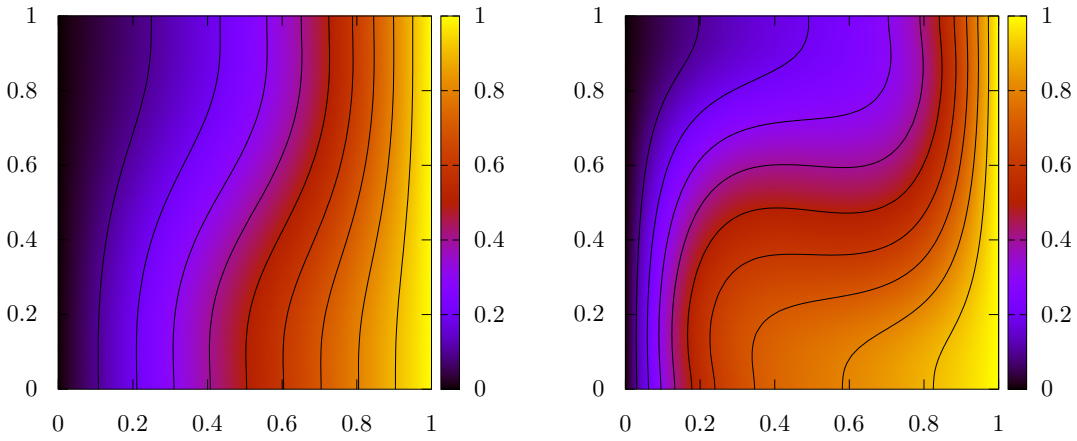


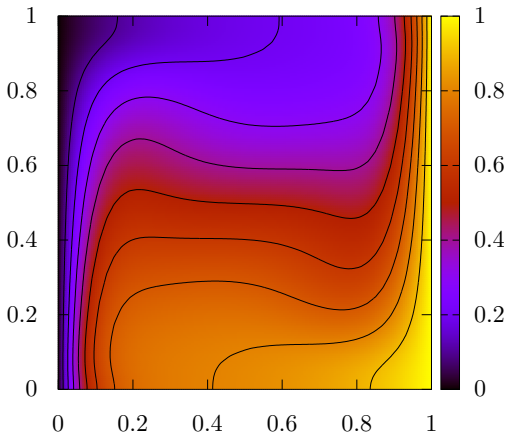
Figure 1.13: Representation of the whole domain for $\rho/\Gamma = 10^6$ (PLDS)

2 Buoyancy

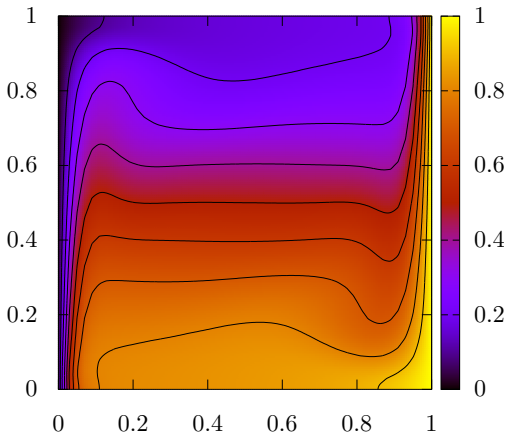


(a) $Ra = 10^3$

(b) $Ra = 10^4$



(c) $Ra = 10^5$



(d) $Ra = 10^6$

Figure 2.1: Contour plots of the temperature