

Best Practice for Engineering CFD: Timetable & detailed content

Monday 13th September 2010			
9:00 – 9: 30 Registration and Coffee			
Time	Speaker	Proposed Title	Proposed Content
9:30 – 9:40	Dr. Chris Lea	Course aims and overview	<ul style="list-style-type: none"> • Introduction to the course.
9:40 – 10:40	Dr Werner Haase	Requirements and challenges for use of CFD in industry	<ul style="list-style-type: none"> • Real-world problems – an eye-opener. • Setting the scene – the need for best practice.
Morning refreshments			
11:00 – 12:00	Prof Wolfgang Rodi	Sources and examples of best practice guidance	<ul style="list-style-type: none"> • On-line and printed sources of guidance. • ERCOFTAC QNET-CFD Knowledge Base Wiki with demonstration.
12:00-13:00	Prof Michael Leschziner	RANS-based turbulence modelling I	<ul style="list-style-type: none"> • The RANS equations – a review. • ‘Exact’ stress-strain relationships and implications. • Eddy-viscosity hypothesis and implications. • Transport models of turbulence – overview. • Alternative length-scale equations and implications. • Second-moment modelling – an outline. <ul style="list-style-type: none"> ○ Stresses and fluxes
Lunch			
14:00 – 15:00	Prof Michael Leschziner	RANS-based turbulence modelling II	<ul style="list-style-type: none"> • Second-moment modellingcontinued. • Algebraic Reynolds-stress modelling – overview. • Non-linear eddy-viscosity modelling – overview. • Considerations on choice of models. • Consideration of key boundary conditions.
Afternoon refreshments			
15:20 – 16:20	Prof Dominique Laurence	LES and LES-based methods I	<ul style="list-style-type: none"> • LES basics – filtering and main modelling approaches for sub-grid scales. • A-priori resource requirements & main limitations. • The numerical scheme: a key issue! • Inlet & outlet boundary conditions, initialisation, statistical sampling. • Wall boundary conditions: resolved or modelled? • ‘Easy’ and ‘hard’ LES applications. When best to stick to RANS (or experiments!).
16:20 – 17:00	Presenter’s panel	Question & answer session	<ul style="list-style-type: none"> • Chaired by Chris Lea.

Tuesday 14th September 2010

Coffee			
Time	Speaker	Proposed Title	Proposed Content
8:40 – 9:40	Prof Dominique Laurence	LES and LES-based methods II	<ul style="list-style-type: none"> • The all pervading effect of the mesh. • LES et al - DES and hybrid methods: developments, expectations and limitations. • Key modelling, meshing and costing decisions. • How can I check my results for other than ‘Channel Flows’? • Best Practice Advice.
9:40-10:40	Prof Kemo Hanjalic	RANS and LES of heat transfer I	<ul style="list-style-type: none"> • Modes of heat transfer and their particular modelling challenges. • Specific requirements on RANS for heat transfer: • Transport equation for scalar flux and its truncation to eddy-diffusivity and algebraic flux models. • Wall treatment: advanced wall functions. • Specific requirements on LES for scalar field and conjugate het transfer. • Visualization of heat transfer: heatlines.
Morning refreshments			
11:00-12:00	Prof Kemo Hanjalic	RANS and LES of heat transfer II	<ul style="list-style-type: none"> • Modelling natural and mixed convection. • Snares of eddy-diffusivity concepts for natural convection. • Challenges to LES for very high Rayleigh numbers: Transient RANS and hybrid LES-RANS. • Modelling heat transfer subjected to magnetic field and rotation, relevant to heat transfer control.
12:00 – 13:00	Prof Charles Hirsch	Quantification and control of numerical error I	<ul style="list-style-type: none"> • Sources of numerical error. • Quantification and control of spatial discretisation errors.
Lunch			
14:00 – 15:00	Prof Charles Hirsch	Quantification and control of numerical error II	<ul style="list-style-type: none"> • Quantification and control of temporal discretisation errors. • Consistency, stability and convergence
Afternoon refreshments			
15:20-15:40	Dr Werner Haase	Improving CFD practice in industry	<ul style="list-style-type: none"> • Closing remarks, from an industrial perspective, in-part referencing material presented over the two days.
15:40 – 16:00	Presenter’s panel	Final question & answer session	<ul style="list-style-type: none"> • Chaired by Chris Lea.