

# EUROMECH

EUROPEAN MECHANICS SOCIETY

Final Report

Date: 07.07.95

Please send this report to the Secretary-General of EUROMECH, Professor Bengt Lundberg, School of Engineering, Uppsala University, Box 534, S-751 21 Uppsala, Sweden, within one month after the Colloquium.

## General

EUROMECH Colloquium No: 336

Dates: June 21st - 23rd  
1995

Title: Flows Dominated by Centrifugal and Coriolis Forces

Co-Chairman:

Place and country: Trondheim, Norway

Is there need of another colloquium on the same subject? Which year? Yes, 1998

## Finance

Conference fee: Non-members NOK 1500,-

Members NOK 1200,-

Funding: The Research Council of Norway

Kværner Energy a.s.

Accommodation (type and cost):

Trondheim Hotell in the city centre, NOK 525,- per night

Meals:

Breakfast at the colloquium hotel (included in room rate), lunch, dinner

The fee included:

Book of Abstracts

3 lunches

2 dinners

coffee/tea

## Participation

Number of participants from each country:

Austria	<u>1</u>	Germany	<u>4</u>	Rumania	<u>    </u>
Belgium	<u>1</u>	Great Britain	<u>    </u>	Russia	<u>3</u>
Bielorussia	<u>    </u>	Greece	<u>    </u>	Slovakia	<u>    </u>
Bosnia	<u>    </u>	Hungary	<u>    </u>	Slovenia	<u>    </u>
Bulgaria	<u>    </u>	Ireland	<u>    </u>	Spain	<u>    </u>
Croatia	<u>    </u>	Italy	<u>3</u>	Sweden	<u>4</u>
Czech Republic	<u>2</u>	Latvia	<u>    </u>	Switzerland	<u>2</u>
Denmark	<u>3</u>	Lithuania	<u>    </u>	Ukraine	<u>    </u>
Estonia	<u>    </u>	Netherlands	<u>6</u>	Yugoslavia	<u>    </u>
Finland	<u>    </u>	Norway	<u>9</u>	Others	<u>8</u>
France	<u>9</u>	Polland	<u>    </u>	Total	<u>54</u>
Georgia	<u>    </u>	Portugal	<u>    </u>		<u>55</u>

Please turn

The colloquium was a follow-up of the earlier colloquia no. 245 on «The Effect of Background Rotation on Fluid Motions» held at University of Cambridge in April 1989 and no. 288 on «Turbulent Flows Undergoing Distortion and Rotation» which took place at Ecole Centrale de Lyon in April 1992. The response with which this colloquium was met made it necessary to reject more than 10 submitted abstracts in order to keep the colloquium within the announced 3 days. 48 abstracts were accepted for presentation and grouped into 10 scientific sessions according to their subject area. The speakers were allotted 20 minutes each for their presentation, except 4 carefully selected keynote lecturers who were devoted 40 minutes. The particular sessions that were introduced by a keynote lecture were those on «Görtler Vortices» (J. M. Floryan, University of Western Ontario), «Swirling Flow» (S. V. Alekseenko, Institute of Thermophysics in Novosibirsk), «Coriolis Effects on Turbulence» (C. Cambon, Ecole Centrale de Lyon), and «Mixtures and Centrifugal Separation» (M. Ungarish, Technion).

The overall theme of the colloquium was flows substantially affected by body forces arising due to either streamline curvature or system rotation, i.e. centrifugal or Coriolis forces, or both. All flow regimes ranging from laminar via transitional to fully developed turbulence were considered, and the emphasis was on incompressible flow phenomena. Stability and transition studies, including the formation and stability of Görtler - like vortices, had been accomplished both experimentally and analytically (Sessions 1 & 2). The influence of system rotation on homogeneous turbulence and turbulent shear flows was explored by means of spectral analysis (RDT, EDQNM) and numerical simulations (LES, DNS) in Sessions 5 & 6, whereas engineering turbulence modelling was addressed in Session 9. Swirling flows, frequently arising in industrial environments (hydrocyclones, rotor-stator cavities, draft tubes), were addressed from a practical point of view in Session 3 and in simpler geometrical configurations in Session 4, while problems associated with centrifugal separation of mixtures were dealt with in Session 8. Spin-up of fluid bodies from rest (Session 7) has obvious relevance for centrifuge applications, and, moreover represents a vehicle for fundamental investigations of vortex dynamics (both experimentally and numerically). Finally, some participants examined the combined influence of rotation or streamline curvature with another body force, notably due to buoyancy (Session 10).

The considerable interest in the theme of the colloquium, probably arising from its practical relevance in combination with the fascinating physical subtleties induced by centrifugal and Coriolis forces, suggests that another colloquium on the same theme can be held in 3 years time.

07.07.95

Helge Andersson