GRAVITATION PC4771 2003 : Dr R.A. Battye

ADMINISTRATIVE ISSUES

Notation

Relativity is riddled with sign conventions. This course will use those in 'Introducing Einstein's Relativity' by d'Inverno, namely $(+ - - -)$ convention for the metric interval. In flat space this implies that

$$ds^2 = \eta_{\mu\nu} dx^\mu dx^\nu = dt^2 - dx^2 - dy^2 - dz^2 \,. \tag{1}$$

4-vectors and 4-covectors will be denoted

$$X^\mu = (t, x^i) \quad \text{and} \quad X_\mu = (t, x_i) \,, \tag{2}$$

respectively, with $x^i = -x_i$. Greek indices denote spacetime indices which run over $\mu = 0,1,2,3$, whereas Latin indices denote space indices which run over $i = 1,2,3$. Unless specifically stated otherwise, units with $c = 1$ will be used.

Relevant Chapters of d'Inverno

SR : 2,3,4,8

GR : 5,6,9,10,12,13,14,15,16,20,22,23

Further information and assistance

Office numbers : 6-28 in Schuster and 46a at Jodrell Bank

Web Page : www.jb.man.ac.uk/ rbattye/gravitation

Email : rbattye@jb.man.ac.uk

Examples sheets

There will be 5 sets of examples sheets which will cover:

0. Extra examples on tensors and variational calculus
1. Revision and preliminary material
2. Manifolds, metrics and connection
3. Curvature and Einstein equations
4. Schwarzschild solution and FRW universe

Handouts

The material for the first double lecture is summarized in a reasonably comprehensive set of notes.

There will be will other handouts but the material for the subsequent lectures will be presented using the board/OHP.