Dear Participants, Let me extend to all 21 of you a warm welcome to this mini-course. The Abstract that you have for the course reads as follows: This mini-course will give examples of basic mathematics, chiefly elementary geometry, algebra, and trigonometry, properties of vectors, and coordinate geometry used in architecture. The architecture that is informed includes classical Greek architecture; the Roman arch; the dome of the Cathedral of Florence; and the design (by Arup) of the concourse beams and the roof vaults (by Utzon) of the Sydney Opera. Possible other topics include: Hanging chains and Rising domes: from Hooke to the dome of St. Peter’s Basilica, Calculus and the weights of the Pantheon and the Hagia Sophia domes, and the shape of the ideal arch.

I have since decided to change the focus just a bit by putting more emphasis on the architectural principles involved. All of the mathematics will be elementary, except at the very end where some basic differential geometry is considered. I think that you will approve. You will learn about a few of the worlds greatest structures and the basic mathematics that informs them and adds to our understanding of them. Accordingly, our topics will be:

Part 1:

**The Roman Pantheon.** Historical architectural narrative and illustration of the basic structural parameters of a dome. Mathematics of vectors, parallelogram law, computation of components.

**The Hagia Sophia.** Description of its architecture with focus on the dome. The application of vectors in the analysis of the thrusts at the base of the dome. Comparison of the first and second domes.

**Gothic Architecture.** Basic structural configurations of the design of Gothic cathedrals with focus on the cathedral of Chartres. Computation of the thrusts of a Gothic arch.

Part 2:

**Sydney Opera.** The design (by Arup) of the concourse beams and the roof vaults (by Utzon) of the Sydney Opera. Underlying coordinate geometry. Comparison of the triangles of Utzon and spherical triangles.

**Comments about the Application of Calculus:** Volumes of revolution and the domes of the Hagia Sophia and the Roman Pantheon.

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