The Problems Mostime to the second 2000 Mathematical Contest in Modeling

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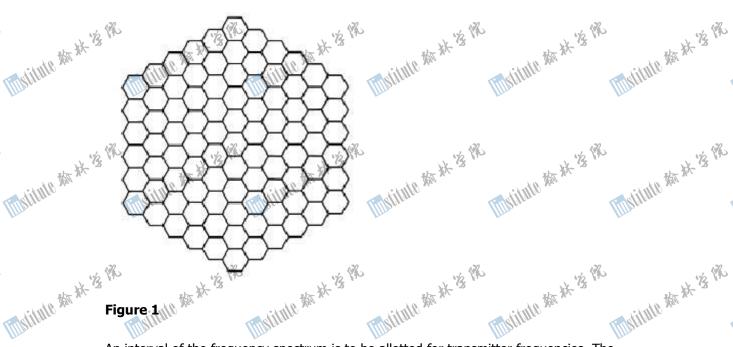
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We seek to model the assignment of radio channels to a symmetric network of transmitter locations over a large planar area, so as to avoid interference. One basic and partition the region into regular. partition the region into regular hexagons in a grid (honeycomb-style), as shown in Figure 1, where a transmitter is located at the center of each hexagon.

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An interval of the frequency spectrum is to be allotted for transmitter frequencies. The 3,.... Each transmitter will be assigned one positive integer channel. The same channel cabe used at many locations, provided that interference from nearby transmitters is avoided. Our goal is to minimize the width of the interval in the frequency spectrum. interval will be divided into regularly spaced channels, which we represent by integers 1, 2, Our goal is to minimize the width of the interval in the frequency spectrum that is needed to assign channels subject to some constraints. This is achieved with the constraints. , over all assign at any location. It is not require an assignment that attains the span.

Let s be the location and assignment that attains the span. span is the minimum, over all assignments satisfying the constraints, of the largest channel used at any location. It is not required that every channel smaller than the span be used in

Let *s* be the length of a side of one of the hexagons. We concentrate on the case that there are two levels of interference.

Timplitute And At 13 PR Requirement A: There are several constraints on frequency assignments. First, no two transmitters within distance 4s of each other can be given the same channel. Second, due to spectral spreading, transmitters within distance 2s of each other must not be given the same

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Mysithte star is Mytitute An 3 Mylithe And Art 3 Mylithe Am A 3 Mylithe Am W. 3 Mysithte star 3 linstitut. can we say about the span in, Requirement B: Repeat Requirement A, assuming the grid in the example spreads arbitrarily far in all directions. or adjacent channels: Their channels must differ by at least 2. Under these constraints, what channels for transmitters within distance 2s differ by at least some given integer k, while those at distance at most 4s must still differ by at least one. What can we and about efficient strates Requirement C: Repeat Requirements A and B, except assume now more generally that those at distance at most 4s must still differ by at least one. What can we say about the span and about efficient strategies for designing assignments as a function (2)Milital Requirement D: Consider generalizations of the problem, such as several levels of interferen interference or irregular transmitter placements. What other factors may be important to institut! Requirement E: Write an article (no more than 2 pages) for the local newspaper explaining your findings. Ministate And At 13 1982 Maritute the state of the This itute the the is the Makitute And At 13 1980 Marithte the the light of the THE STATE OF THE PARTY OF THE P institut! Ministate And At 18 1980 Marithle And At 13 182 Maritale And At 13 180 面的排作 Makitute And At 12 1980 Marithus Mark 13 18 institut? Militate And At 18 1980 Marithle Mark if the Mostitute And At is the 面的排作物。 Maritate And At 12 1980 Marithus Mark 13 18 Ministate And At 18 1980 Marithle Market is the Makitate Make the 18 1980 Makitute And At if the The state of the s Majorithte Market is the institut. Militate Aft At '8 1980 Marithle Mark if the Maritate And At 13 1980 Maritate Market is the Makitute And At if the The state of the s lingtitut? 1. 地址海外 地址资化 1. 40 张 1. 地址设置 1. 4. 4. 18 18

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