Conference registration distributions

The StatPhys conferences on statistical physics take place every three years on a different continent. StatPhys24 [1] was held in Cairns, Australia, from 19–23 July 2010, with approximately 550 participants. StatPhys23, which took place three years earlier in Genoa, Italy, attracted about 1200 attendants. The number of participants thus fluctuates greatly from conference to conference, making it difficult for organisers to have an idea of this important number at an early stage in the registration process. As people tend to register late, the authors in [2] asked the following question: Can a reliable estimate be made of the final number of participants based on early registrations? Comparing two large conferences, the results in [2] suggest that there may be some universal behaviour in registrations close to a deadline. The purpose of this note is to report on the registration distribution of StatPhys24, which had quite a different structure from that of StatPhys23, as described below. We observe however that the two distributions obey similar laws, from which we reaffirm the possible existence of universality in conference registrations. It is conceivable that other type of deadlines, such as tax returns or student course enrolments show similar universal behaviour.

StatPhys23 had an online registration period of ten weeks, starting around the end of January 2007, with the deadline for registration and abstract submission on 31 March [2]. The registration data suggests that final participant numbers may be predicted through a simple model where the probability of a delegate registering at a particular time is inversely proportional to the time remaining until the deadline [2]. It is of interest whether such a response to a deadline can be understood from the point of view of microscopic models of human dynamics [3].

StatPhys24 opened its registration early December 2009, and knew four deadlines: January 31 was an early bird deadline with a substantial reduction in registration fee. This deadline was then extended until March 1. To submit an abstract, participants had to register first, and pay the conference fee. The abstract submission deadline was initially set at 31 March, and also this deadline was extended until April 30, 2010. After this last deadline, participants could still register but no longer submit an abstract for an oral presentation. The total number of registrations for StatPhys24 is depicted in Figure 1, and clearly shows a significant increase shortly before each of the four deadlines, followed by a small plateau thereafter. For participants registering before the first deadline, financial considerations clearly played a role. While the second deadline encouraged more people to register by extending the time available to claim the reduced fee, most participants who felt strongly about the financial gain would have already registered by the first deadline. The curves between the first and second, and between the second and third deadline, are quite similar to the results from StatPhys23 [2], and may be modelled with the assumption that the likelihood of a delegate registering is inversely proportional to the time remaining to the deadline.

The probability to register at time t is then

$$p(t) = \frac{C}{t - T},$$

where T is the time of the deadline, and C is a constant which will be fixed by the total number of participants registering in the corresponding time period. Between the first (T_1) and second (T_2), and second and third (T_3) deadline, the number of registrations at time t, is denoted by

$$N_i(t) = \int p(t')\,\mathrm{d}\,t' = N(T_i) + C_i \log\left(\frac{T_i - T_{i-1}}{T_i - t}\right) \qquad (i = 2, 3).$$

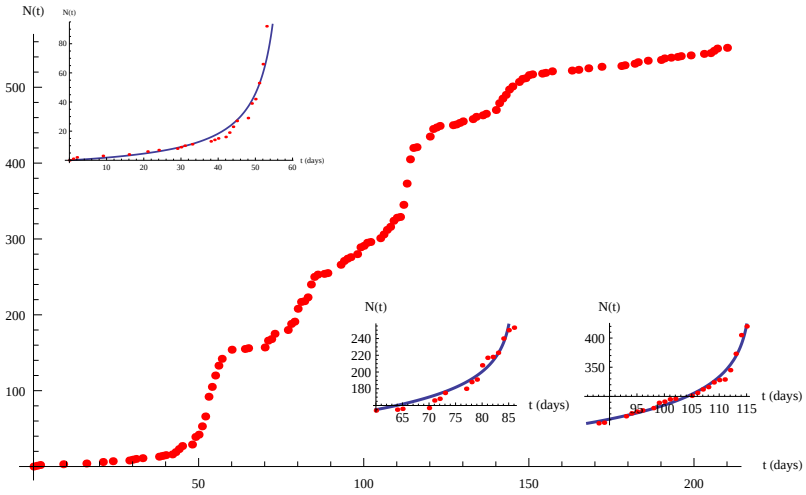

Figure 1: Total number of registrations. Qualitative changes correspond with the four registration deadlines. Insets: Top left, registrations before the first deadline; Bottom right, registrations between first and second, and between second and third deadline.

This leads to a logarithmic singularity that can be regularised using the discreteness of time measured in registration days. The model above does not fit the observed behaviour well in the lead-up to the first deadline. For the first deadline, financial considerations played a role, and committing at this early stage meant that registration was postponed more strongly. We will assume that in such a scenario the pressure to register is inversely proportion to the square of the remaining time, and is given by

$$p(t) = \frac{C}{(T-t)^2}.$$

The number of registrations is then given by

$$N(t) = \widetilde{C}\left(1 - \frac{T}{T-t}\right),$$

and this fits the observed data reasonably well. Registrations near the fourth and final deadline behaved quite differently. Although there was an initial linear increase, similar to what happened near the other deadlines, the steepening tail turned out to be concave. This can be explained by the fact that the total number of registrants was approaching its maximum capacity, causing the steepening feature to flatten very close to the deadline.

In conclusion we see that registration for a conference tends to have a logarithmic singularity near the deadline, which is regularised by the discreteness of time measured in days. However, in case financial considerations play an important role, the number of registrations has a stronger divergence, and a good approximation in this case is given by an inverse proportionality with time. Both these observations confirm the conclusion reached in [2], even though StatPhys24 was held at another continent and knew four different registration deadlines. It would certainly be interesting to perform a more substantial study on the distribution of registrations on a wider set of data, or on distributions related to other types of deadlines.

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