

**Zdeněk Pospíšil**

MASARYK UNIVERSITY, FACULTY OF SCIENCE, BRNO, CZECH REPUBLIC

e-mail: [pospisil@math.muni.cz](mailto:pospisil@math.muni.cz)

**Eva Janoušová**

MASARYK UNIVERSITY, INSTITUTE OF BIostatISTICS AND ANALYSES, BRNO, CZECH REPUBLIC

e-mail: [janousova@iba.muni.cz](mailto:janousova@iba.muni.cz)

**Tomáš Pavlík**

MASARYK UNIVERSITY, INSTITUTE OF BIostatISTICS AND ANALYSES, BRNO, CZECH REPUBLIC

e-mail: [pavlik@iba.muni.cz](mailto:pavlik@iba.muni.cz)

**Jiří Mayer**

UNIVERSITY HOSPITAL, DEPARTMENT OF INTERNAL MEDICINE AND HEMATOONCOLOGY, BRNO, CZECH REPUBLIC

e-mail: [jmayer@fnbrno.cz](mailto:jmayer@fnbrno.cz)

**Marek Trněný**

INSTITUTE OF HEMATOLOGY AND BLOOD TRANSFUSION, PRAGUE, CZECH REPUBLIC

e-mail: [Marek.Trneny@uhkt.cz](mailto:Marek.Trneny@uhkt.cz)

## Disease-free survival – (non-)parametric estimation

Treatment efficacy in patients with a disease is usually expressed using the disease-free survival, i.e. the probability of staying in a remission after its achievement or after a therapeutic intervention. However, this concept does not allow to evaluate the proportion of disease-free patients in subsequent remission after further possible relapses. The method proposed by Klein et al. enables to estimate the probability of being in first and second remissions.

The contribution presents two new methods of estimation the probability of being in any of remissions. The first one extends the non-parametric estimation proposed by Klein et al. that is based on Kaplan-Meier estimators of survival functions. The second one utilizes a multistate model and it adopts the method for matrix model parameters identification based on quadratic programming (the idea originally elaborated by Wood) to estimate probabilities of remissions and relapses of any rank. The methods are illustrated on data of chronic myeloid leukaemia patients.

### REFERENCES

- [1] J. P. Klein, N. Keiding, Y. Shu, R. M. Szydlo, J. M. Goldman, *Summary curves for patients transplanted for chronic myeloid leukaemia salvaged by a donor lymphocyte infusion: the current leukaemia-free survival curve*. *British J. of Haematology* **109** 148–152.
- [2] S. N. Wood, *Inverse problems and structured-population dynamics*. In S. Tuljapurkar, H. Caswell (eds.) *Structured-population models in marine, terrestrial and freshwater systems*. Chapman & Hall, N.Y. 1997, 555-586.