## 先端科学技術研究科 修士論文要旨

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論文題目	Mathematical Model of Horse-Rider Interaction in Jumping 跳躍におけるウマ-騎手インタラクションの数理モデル		
要旨			
In horse-riding, a rider controls the horse through their interaction so that the horse runs fast or jumps over hurdles. Even though the rider has an important role in controlling a jumping horse, the rider's policy is still open in the jumping. Thus, to identify the rider's policy in the jumping as the understandable quality is required. As the quality, we applied the peak force, the peak power, and the total work that the horse needs to produce. To identify the policy, we regarded a jumping horse and its rider as the one-dimensional system in the vertical displacement and modeled it, based on spring- damper-mass models proposed in horse's trot, using the displacements of the centers of gravity of horses and riders from video data. In this modeling, we first examined the applicability of the rider in successful two trot's models to the jumping. Based on the result of the trot's models in the jumping, we successfully modeled a jumping horse and its rider. The result indicates that the rider's policy is to minimize the peak force and power that the horse produces at landing. This means that the rider's policy can be to suppress the sudden muscle motion of the horse at landing in the jumping. In addition, the nature of horse-rider interaction in the jumping would be the movement in the vertical displacement. In conclusion, this study provides insight into the nature of horse-rider interaction in the jumping and the rider's policy.			