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# Position and velocity perturbations for the determination of the Earth's gravity field

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The Earth's gravity field has been significantly improved, thanks to the satellite gravity missions such as CHAMP and GRACE. Further improvement is expected as a result of the launch of the GOCE mission this year. Although space measurements from the satellite gravity missions for the determination of the Earth's gravity field have been well known to be of extremely high accuracy and almost continuously collected, none of any current mathematical methods used to produce the Earth's gravity models can match what the modern space technology can provide. In this talk, we will build a completely new mathematical model for the determination of the Earth's gravity field, which is theoretically capable of fully utilizing any potential advantages of the modern space geodetic measurements. The very core of the model is based on our new theory of position and velocity perturbations to be presented here. For more details, see Xu (2008, Celest Mech Dynam Astron).